TECHNOLOGY DEPT.

# The Refrigeration Service Engineer

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VOL. 10 NO. 8

# A STATEMENT *of* LOYALTY

Patented and pat. pending.

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*with the new*
**Self-Adjusting SLEEVE LOCK**

WHAT is Loyalty? Webster defines loyalty as "devoted allegiance," and today, we must define the term "devoted allegiance" in its broadest scope—All Our Cooperation. For us in the refrigeration industry, it must mean first, loyalty to our country and its people in winning the war, secondly, loyalty to every individual whether he is on the battle front or the production front, and third, loyalty to each other from the manufacturer through to the serviceman. We need All Out Cooperation as well as All Out Fitness.

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Chicago Seals pledge their wholehearted effort to supply seals so vitally necessary in maintaining equipment. We all know that seal difficulty is a common ill. Most domestic and commercial refrigerating equipment will be kept operating if seals are provided. Conserving vital materials to the maximum degree, Chicago Seals have developed units for even the toughest jobs. Depend upon the Chicago Seal Company.

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**KEEP EVERY CYLINDER AT WORK!**

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**ANSUL CHEMICAL COMPANY, MARINETTE, WIS.**

RS-30

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VOLUME 3 DETROIT, MICH.

*Published in the Interest of Equipment Conservation through More Effective Servicing*

# Leaking Compressor Valves and Lost Expansion Valve Charge

***LEAKING COMPRESSOR VALVES.*** **Leaking compressor valves cause excessive running time. A slight leak may cause temperatures lower than normal—a bad leak higher than normal.**

**Detection:**

**A. When turned over by hand compressor feels weak.**

**B. When discharge shut-off valve is closed, if pressure decreases quickly it indicates leaking discharge valves.**

**C. Single cylinder compressors will not pump low vacuum and multiple cylinder compressors will not pump**

***EXPANSION VALVE LOST CHARGE.*** **Gradual loss of charge will cause starved evaporator and low suction pressure or short cycling. Complete loss of charge causes valve to close off.**

**Be sure to check for frozen valve, clogged strainer and valve location, before removing valve.**

**Detection:**

**A. Warming feeler bulb will not affect**

***NOTE: This may also be true with clogged strainer or frozen valve.***

B. When discharge shut-off valve is closed, if pressure decreases quickly it indicates leaking discharge valves.

C. Single cylinder compressors will not pump low vacuum and multiple cylinder compressors will not pump vacuum as quickly as usual.

D. Head pressure may be low.

Detection:

A. Warming feeler bulb will not affect

*NOTE: This may also be true with clogged strainer or frozen valve.*

B. Allow valve to warm up, then warm feeler bulb and see if valve is open.

*Reprints of this—the third of a series of helpful hints—will be supplied upon request.*

| SYMPTOMS | | | | | PROBABLE CAUSE |
|---|---|---|---|---|---|
| *Condition of Job* | *Evaporator Condition* | *Running Time* | *Suction Pressure* | *Suction Line Temperature* | |
| Warm | Warm | Won't Start | Low | Warm | Expansion valve lost charge |
| Warm | Warm | Continuous | High | Warm or Normal | Compressor valves leak |
| Warm or Normal | Starved or Partly Refrig. | Short Cycle | Low | Warm | Expansion valve lost charge |
| Normal or Too Cold | Cold | Continuous or Too Long | Normal or Low | Normal | Compressor valves leak |


# DETROIT LUBRICATOR COMPANY

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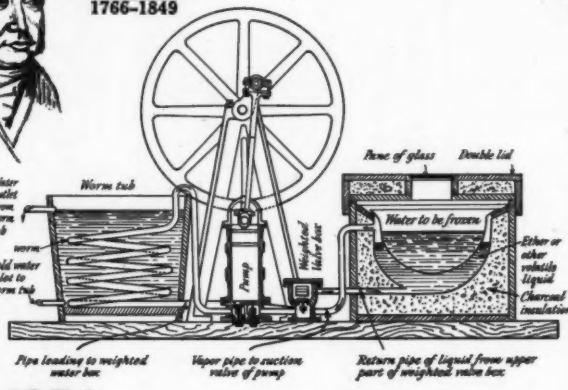
## REFRIGERATION HAS COME A LONG WAY

Jacob Perkins
1766–1849


Pane of glass
Double lid
Water outlet from worm tub
Worm tub
worm
Cold water inlet to worm tub
Pump
Weighted valve box
Water to be frozen
Ether or other volatile liquid
Charcoal insulation
Pipe leading to weighted water box
Vapor pipe to suction valve of pump
Return pipe of liquid from upper part of weighted valve box

**1834**—Jacob Perkins, an American Engineer, is generally credited with inventing in 1834 the first machine, of the compression type, capable of making ice in commercial quantities. As his patent drawing shows, this first machine comprises all the essential parts of modern equipment. Perkins also employed brine, circulated through his evaporator in pipes, to freeze boxes filled with water—the forerunner of the present-day indirect system of refrigeration.

**1942**—It is a far cry from Jacob Perkins' first crude compressor-evaporator machine, to the modern efficient, precision-built mechanical refrigerator. Refrigerants, too, have improved—in place of the ether used by Perkins, refrigeration engineers today have at hand a variety of reliable refrigerants, from which to select the one best suited to each particular job. "Virginia" Refrigerants provide a selection for a broad range of cooling applications.

"VIRGINIA" REFRIGERANTS
AGENTS FOR KINETIC'S "FREON-12"
VIRGINIA SMELTING CO.
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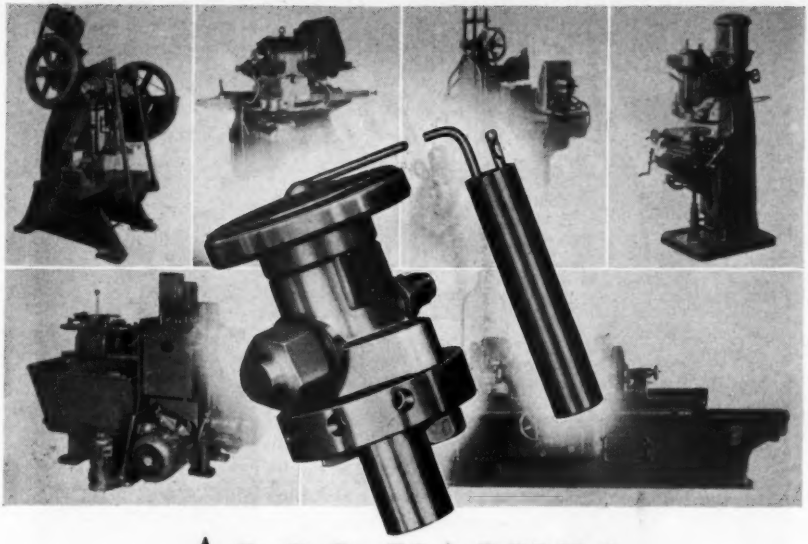

# ALCO VALVES

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Thousands of plants engaged in War Production have found close temperature control essential to meet the exacting demands of the U. S. Army, Navy, and Air Corps. Air Conditioning of tool rooms, aircraft testing laboratories, material testing chambers, ordnance plants and other war production industries is doing much to increase the speed and efficiency of both men and machines.

For years, Alco engineering and design, quality materials, and precision construction have set standards for the entire industry. Today, the high efficiency and rugged dependability of Alco Refrigerant Controls is more important than ever, to meet the rigorous demands of all-out War Production. They have thoroughly proven their superiority and ability to improve the performance of any air conditioning or refrigeration system.

As a factor in proper temperature control they are as essential as many of the machine tools whose work is made faster and more efficient because of industrial air conditioning.

ALCO VALVE COMPANY

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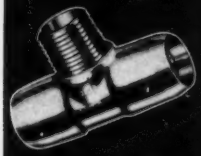
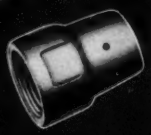
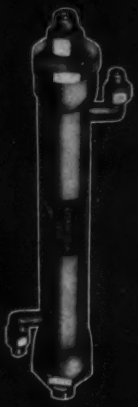
*Engineered Refrigerant Controls*

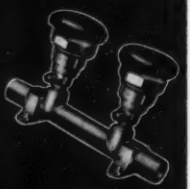
THE STANDARD OF THE INDUSTRY

# Functioning
## FOR THE "LONG HAUL"









● Mueller Brass Co. valves, fittings and accessories are sturdily and dependably built. They have a well earned reputation for quality and are doubly desirable under present day conditions. Since refrigeration products are becoming more difficult to procure with each passing day, it is most essential that those which are installed be efficient and provided with endurance for the "long haul."

All Mueller Brass Co. refrigeration products are designed and manufactured specifically for mechanical refrigeration work. Tees, nuts and elbows, for instance, are made of forged brass —and many other fittings, bodies, etc. from specially processed brass rod.

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## OUR RECORD OF WAR PRODUCTION

| | | | |
|---|---|---|---|
| ★ | May 1st, 1941 | 5% War Effort | |
| | Sept. 1st, 1941 | 15% War Effort | ★ |
| | Nov. 1st, 1941 | 30% War Effort | |
| ★ | January 1st, 1942 | 45% War Effort | ★ |
| | March 1st, 1942 | 70% War Effort | |
| | May 1st, 1942 | 75% War Effort | |
| ★ | By August 1st, 1942 | 95% War Effort | ★ |

## TECUMSEH PRODUCTS CO. TECUMSEH, MICHIGAN

Chieftain

Ranco
EXACT
REPLACEMENT CONTROLS
SAVE TIME ON EVERY INSTALLATION–Just Toss Out the Old–Slip in the New!
NO RETURN CALLS TO CHECK SETTINGS
Better Profits!–Satisfied Customers!
NO ADJUSTMENTS OF ANY KIND!
Ranco
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COLUMBUS
OHIO

# The Refrigeration Service Engineer

Vol. 10 No. 8

August, 1942

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

**Cover**

Mobile heating and cooling system used to air condition passenger transport planes while in port. See article on page 21.

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# MEET *All* INSTALLATION CODES

**Weatherhead** valves, fittings and accessories are made to meet the refrigeration codes of all cities.

**Valves** include angle, two-way, three-way packless, compressor, by-pass, check, receiver tank and relief types.

**Fittings** have an exclusive flat-sided construction that provides no slip—no strip—no leak installations.

**Accessories** include pipe flanges, adapters, receivers, charging hose, manifolds and testing valves, all finely machine finished.

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300 East 131st Street
CLEVELAND, OHIO

# WEATHERHEAD

*Refrigeration Valves, Fittings and Accessories*

The Refrigeration Service Engineer

Vol. 10, No. 8 CHICAGO, AUGUST, 1942 $2.00 Per Annum

# Rubber Situation Grows More Critical

ONLY trucks engaged in services essential to the War effort or public health and safety will be entitled to recapped or new tires after July 28 under a drastic revision of the tire rationing regulations announced by the Office of Price Administration.

The revision, which was necessitated by increasing evidence that quotas will not provide for the needs of all those on present eligibility lists, will cut off from tires all privately operated trucks carrying alcoholic beverages, soft drinks and similar beverages, tobacco products, confections, candy, flowers, toys, novelties, jewelry, furs, radios, phonographs, musical instruments, or other luxury goods, unless the transportation of such things is only incidental to the main service performed by the vehicle.

Unable to increase quotas because of the rubber shortage, OPA asked the advice of the Office of Defense Transportation as to what reclassifications of motor transport services could be made to effect the necessary reductions and at the same time preserve the most essential operations. In reclassifying a number of transport services in the same category as retail delivery, OPA has followed the lines of ODT recommendations.

Besides the categorical exclusions from eligibility, the revision gives local War Price and Rationing Boards authority to winnow applications received from eligibles under List A, which includes the most essential transportation functions. After the change in the regulations becomes effective, trucks, transporting raw materials, semi-manufactured or finished goods, including farm products and foods, will be recognized as eligible for tires only if the services they perform are essential to the war effort or public health and safety. Heretofore, trucks transporting commodities of that kind could be denied tires only if the applications before a board were in excess of its quota.

Also dropped from List A eligibility under the same conditions are private carriers furnishing transportation for incidental maintenance services—the cleaning of office buildings is given as an example—or for the purpose of repairing any portable household effects, or for providing materials or services solely for landscaping or beautification of any construction project or other establishment.

These regulations do not apply to common carriers, which still may carry the goods which private carriers no longer may move, except as an incidental part of their operations, on rationed tires.

Although it is recognized that some part of the load now carried by privately operated trucks will merely be shifted to common carriers as a result of the new change

in the tire rationing regulations, the overall effect is expected to be a substantial saving in rubber.

In the first place, movement of some non-essential goods probably will be halted entirely. Moreover, some part of the load which is switched from private to common carrier will, of course, go by rail or water. Even where a common carrier truck is used, greater efficiency is expected to make for a considerable savings in tires. The common carriers are looked upon as generally better able to maintain full loads than the private trucks. They can aggregate and schedule their loads in such a way that they have a minimum of empty mileage, whereas in many instances the company trucks and contract carriers haul loads in one direction and return empty.

The owner of a truck performing an essential transportation service not provided for in the List A eligibility classifications of the regulations may file an application for a certificate for recapped tires under List B (which includes services deemed essential by the local board but not provided for in List A) up to the 20th day of any month. If the board still has any recapped quota left, it may issue such certificates after the 25th of the month.

The reduction in the truck eligibility list is accomplished by Amend. No. 22, effective July 28, to the Revised Tire Rationing Regulations.

# "Throw" of Air of Unit Coolers and Its Effect on Shrinkage

## Practical Tests Disclose Interesting Data on Effect of Air Motion on Dehydration of Meats

By J. ASKIN*

TESTS have been conducted in the laboratory of Fedders Manufacturing Company recently on the effect of air motion on dehydration of meats. Unit coolers of the type shown in Fig. 1 and of various face areas were tested and the air velocities measured at various distances away from the face of the units. The results were plotted and are shown in Curve Sheets Figures 2, 3 and 4. It may be noted that the "throw" of air, or the distance in feet from the unit cooler face depends upon the initial velocity at the face of the unit cooler as well as upon the face area of that unit. In other words, if the unit has a greater initial velocity at the face, the "throw" of air will be greater; if the face area is larger, the "throw" of air is also greater.

A unit may appear to have a high face velocity and yet when installed in a refrigerator the velocity at the sides of that refrigerator where the meat is hung may be so low that the installation would be satisfactory even for the refrigeration of as perishable a product as meats. For some years past many have had a hesitancy to use unit coolers for the refrigeration of meats and yet they would not hesitate to use this same type of unit for the preservation of fruits, vegetables, beer, and other less perishable products.

FIG. 1

* Chief Engineer, Fedders Mfg. Co.

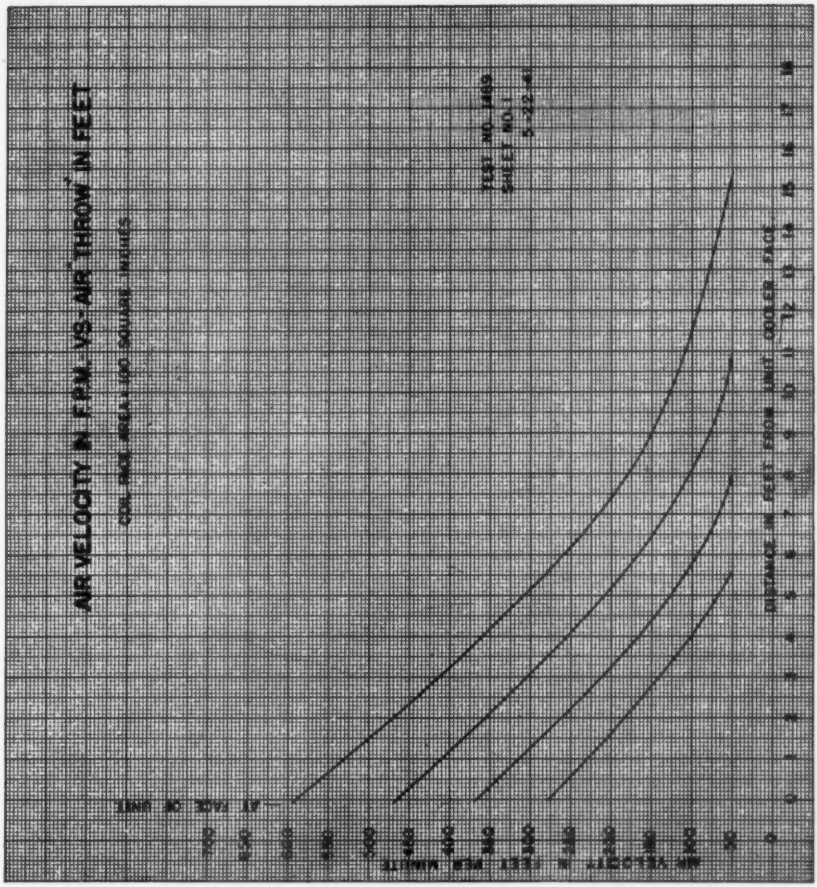
AIR VELOCITY IN F.P.M. VS. AIR THROW IN FEET
COIL FACE AREA IN SQUARE FEET
TEST NO. 1490
SHEET NO. 1
5-22-42
AIR VELOCITY IN FEET PER MINUTE
AT FACE OF UNIT

Fig. 2—The curves shown above and in Figs. 3 and 4 on pages 14 and 15 show the air velocity in feet per minute at various distances from the unit cooler. Each curve is for a different face velocity at the cooler and each figure number is for a different coil face area.

The September issue of this journal will contain a practical example of how these charts are used in applying unit coolers to such exacting refrigeration jobs as meat preservation. It is in this field of endeavor where the success or failure of the installation depends so much on the velocity of the air over the meats. These charts provide a definite means of determining how high the velocity will be at various points of the cooler.

Other tests made, curves of which will appear in the September issue, show the meat shrinkage at various air velocities and at varying relative humidities over periods of one, two, three and four days.

These curves, together with Figs. 2, 3 and 4, make it possible for the application engineer to select the meat shrinkage expected, then calculate from the data given, the face velocity in feet per minute at the unit cooler and the velocity of the air passing over the meats at various distances from the cooler.

This is one more step in the direction of guaranteed refrigeration and should be a welcomed addition to both the application engineer and the operating engineer. It would seem too, that where the face velocity of the existing unit can be determined the service engineer should be enabled to clear up some of the more troublesome installations.

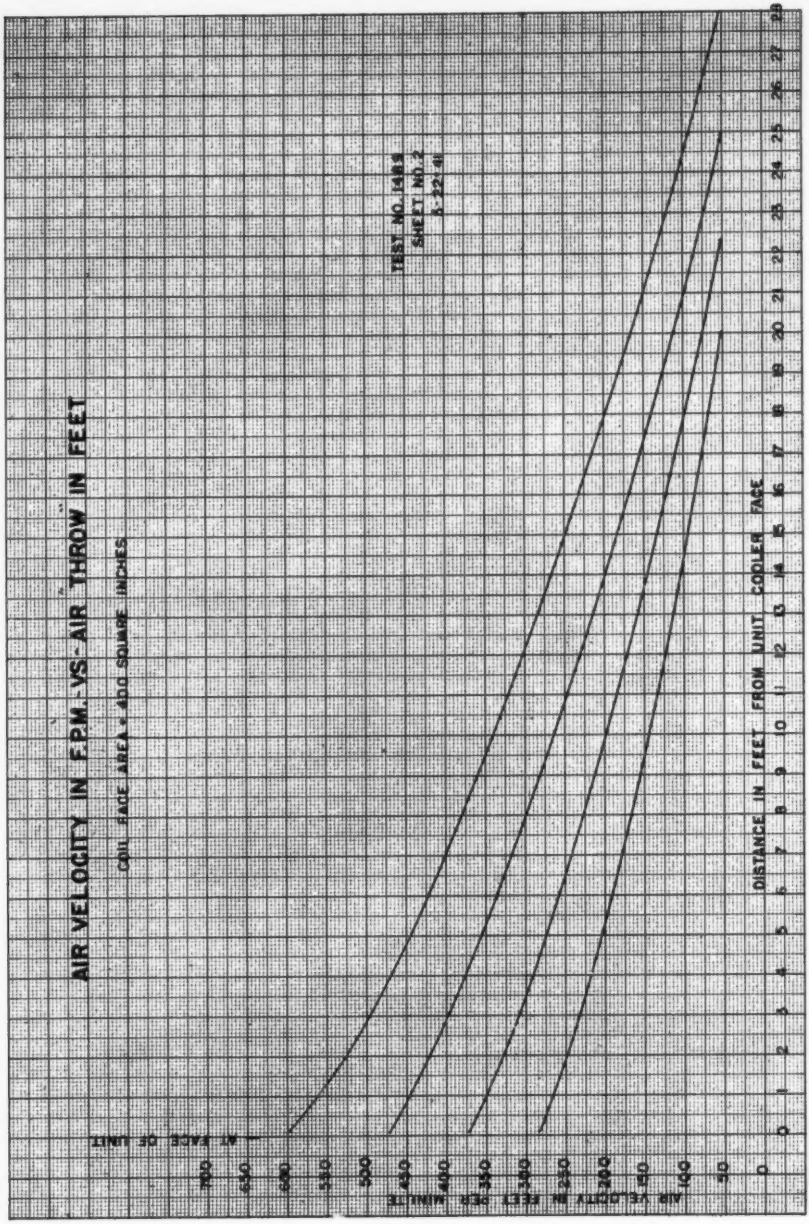
AIR VELOCITY IN F.P.M. VS. AIR THROW IN FEET
COIL FACE AREA = 400 SQUARE INCHES
TEST NO. 1413
SHEET NO. 2
A-22-41
AIR VELOCITY IN FEET PER MINUTE
DISTANCE IN FEET FROM UNIT COOLER FACE
AT FACE OF UNIT

FIG. 3

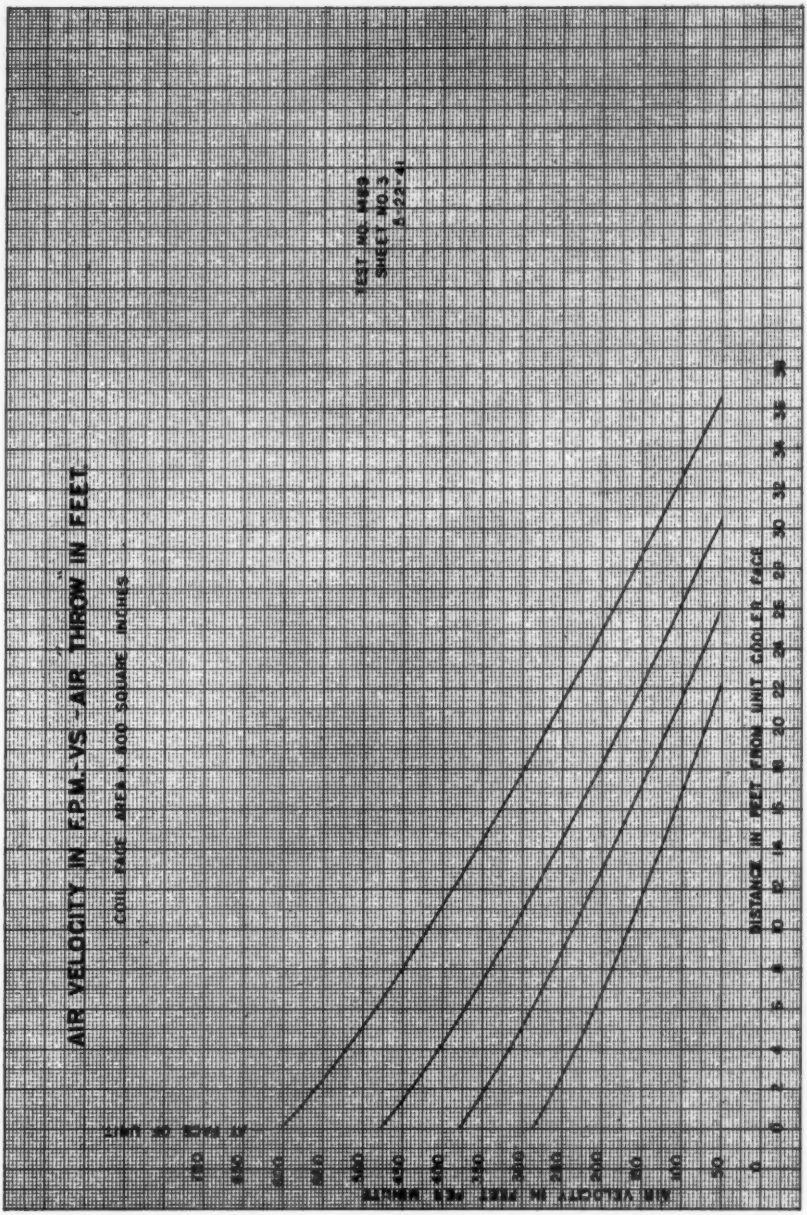
AIR VELOCITY IN F.P.M. VS. AIR THROW IN FEET.
COIL FACE AREA 1.10 SQUARE INCHES
TEST NO. 1183
SHEET NO. 3
A-22-41
AIR VELOCITY IN FEET PER MINUTE
DISTANCE IN FEET FROM UNIT COOLER FACE

FIG. 5

# Preparing Reports Under Maximum Price Regulation No. 165

By HARRY ALTER *

THIS regulation should be carefully studied by every service and repair organization. Briefly, it provides that no price may be charged for appliance repair (refrigerators, radios, toasters, washing machines, vacuum cleaners, electric irons, etc.) that is higher than the highest price charged for such similar repair during March, 1942. There are provisions in the regulation for determining the ceiling price for repair work of such type or kind which was not performed during March, 1942, and again briefly, such ceiling is the price that would have been charged during March, 1942, if the service organization had been called upon to do that particular repair job.

There are other provisions which cover "seasonal variations in price," "service not performed during 1942," "Transfers of business," etc. Interesting also is an exemption to the regulation for services rendered others than consumers such as for commercial or industrial houses.

Generally speaking, MPR No. 165 is fair, comprehensive and an honest effort in the Administration's anti-inflation drive.

However, every refrigeration repair and service organization is faced with an immediate and serious problem in complying with the provisions of the order covering records and reports. This section of the order is reprinted as follows:

**"Base-period records and reports.—Every person selling consumer services for which, upon sale by that person, maximum prices are established by Maximum Price Regulation No. 165 shall:**

**(a) Preserve for examination by the Office of Price Administration all his existing records relating to the prices which he charged or pricing methods which he used for such of those consumer services as he supplied during March, 1942, and his offering prices for supply of such consumer services during such month; and**

**(b) Prepare on or before September 1, 1942, to the full extent of all available information and records, and thereafter keep for examination by any person during ordinary business hours, a statement showing:**

**(1) The highest prices which he charged for consumer services supplied during March, 1942, for which prices were regularly quoted in that month;**

**(2) The pricing method, if any, regularly used during March, 1942; and**

**(3) All his customary allowances, discounts, and other price differentials.**

**A duplicate of this Statement shall be filed, on or before September 10, 1942, with the appropriate War Price and Rationing Board of the Office of Price Administration."**

The public press has carried many stories of the vast field organization being assembled by OPA for checking price violations so strict compliance with MPR No. 165 is recommended and particularly so in connection with "reports and records" requirement.

Under paragraph (a) many of the smaller service companies may now find it necessary to prepare such records for the first time, because in the past they did not need to have formal price lists for their service charges. Certainly under this rule it becomes necessary to establish the method of pricing used during March, 1942, and preserve this record for possible inspection by an OPA field agent or any customer.

Also, under paragraph (b) it now becomes necessary to prepare on or before September 1, 1942, the required information under sub paragraphs (1) (2) (3) and file a duplicate of same on or before September 10, 1942, with the district office of OPA or in the absence of a local district office, then with the State office of the OPA.

In the preparation of the reports required under MPR No. 165, is where the service organization repairing refrigerators will find difficulties. Repairs in most other fields (automobiles for example) standard repair prices have long been a trade custom. In automobile repairing the dealer is provided by the factory with flat rates for nearly every kind of repair. In such cases there are no price ceiling complications, to beset the dealer as is the case in appliance charges.

* President, The Harry Alter Co., Chicago.

SMITH REFRIGERATION SERVICE CO.

126 MOZART ST. FOREST PARK

PHONE CENTRAL 4285

**STATEMENT**

**IN ACCORDANCE WITH MAXIMUM PRICE REGULATION NO. 165**

**LABOR SELLING PRICE PER HOUR $.....**

This figure is the highest we charged during March, 1942. Supporting evidence is the copies of bills attached hereto charged by us to the customer indicated which were calculated at the above rates for direct labor.

**SELLING PRICE OF MATERIAL USED**

The highest prices we charged for material used in our repair work during March, 1942, is based on the attached price list which lists the most important items used by us.

**OVERHEAD AND PROFIT**

The highest prices we charged during March, 1942, as shown above for labor and material included our cost of overhead and our profit margin.

**MINIMUM CHARGES**

The trade practice for minor repair jobs is to charge a minimum charge. During March, 1942, the highest minimum charge "was $....." Supporting evidence of copies of such bills are attached hereto.

**DECLARATION**

I (we) hereby declare that the foregoing statement is true and correct; that I (we) have preserved all existing records relating to the prices we charged, or pricing methods we used during March, 1942; and that a copy of this statement was mailed to the Office of Price Administration at....., .....
City State

on .....
date

Signed.....

.....

FIG. 1

In the general field of refrigeration repair, flat charges rarely have been established. Most repair jobs have been priced on the formula of a set selling price for labor on each job. Thus two hours of labor including cost, overhead and profit, if the figure most frequently used was $1.50 per hour, would be $3.00. To this would be added the retail selling price of any material used. Thus the selling price of labor plus the selling price of material makes up the selling price of the complete repair job.

Of course, if the selling price for labor is $1.50 per hour, for example, that price includes mechanic's time, shop overhead, auto mileage, if any, and profit. Most repair shops must get more than $1.50 per hour and in the larger cities that figure often represents the cost rather than the selling price.

That being the case, service organizations should set up their reports and records in accordance with such a formula. Then of course, it would be permissible for them to use the highest direct labor rates that they *charged* during March, 1942. Likewise on material; and such reports and records must be set up to prove the authenticity of their contention that their figures were the highest calculated on similar repair work during March, 1942.

Boiled down then it seems as if the statement that must be prepared before September 1 (a copy of which must be filed with OPA before September 10th) would look something like Fig. 1 when prepared by the present day average repair shop, which never operated on a "flat rate" basis.

This statement should be retained by the service company and a copy sent to local or state OPA office.

In cases where seasonal service provides no March 1942 base price, or where service work of similar kind can not be priced under the "March 1942 formula," then it is necessary to fill out Form 265:1 or 265:2 showing how prices for such work were arrived at.

But for the ordinary refrigeration dealer or service organization, the simple declaration shown in Fig. 1 should suffice. His real obligation to the Public and the Nation is to see that his charges for repair work do not exceed the ceiling price (March 1942) and thus contribute his bit to the war effort by helping prevent inflation.

# Servel Develops Special Cooling System for Bright Annealing Furnaces

By BERT MERRILL

IN addition to pioneering gas heat-treating methods for mass-producing fabricated metal parts, the engineering department of Servel, Inc., Evansville, Ind., has also developed a new method of refrigerating and dehydrating air for bright annealing furnaces, it has recently been announced.

The use of the refrigeration equipment for annealing furnaces is an application for which Servel has installed several systems, specifically work on war production which demands perfection in parts. The war has stimulated demand for industrial refrigeration as well as heating, according to Servel, which has been making progress by leaps and bounds.

The new Servel process is designed for "bright" annealing furnaces for the most part, which means furnaces designed to handle steel, copper, brass or various metal alloys which have become hardened or contain internal stresses from previous operation, and which maintain temperatures between 1,200 and 1,600 Fahrenheit. At these high temperatures, the metals will oxidize or scale badly if brought in contact with ordinary atmospheric air or atmosphere containing the slightest particle of moisture. In consequence it is the general annealing practice to create an "artificial atmosphere" over the metal by burning to partial consumption ordinary gas mixed with an insufficiency of air to prevent moisture precipitation. Resulting gas from this combustion contains heavy quantities of carbon monoxide, carbon dioxide, nitrogen, unburned illuminating gas and water vapor formed by the combustion of hydrogen.

If this water vapor is left in the air, the temperature of the furnaces immediately breaks it down into free hydrogen and oxygen, the latter the agent which attacks the metals and causes oxidation. It is therefore necessary to dehydrate entirely this "blanket gas" between the combustion chamber and the main annealing chamber. This is done by first passing the hot by-products of combustion through a series of coils immersed in a tank through which tap water flows, resembling in effect a simple refrig-

erant condenser of the type used to cool hot refrigerant gas.

In most plants the gas can be cooled to around 90 degrees and complete saturation in this water tank, circulating ordinary room temperature water. Then it must be passed over a refrigerant coil held between 32 and 38 degrees to reduce the temperature of the gas to or below 40 degrees Fahrenheit.

The gas then leaves this chamber at a dewpoint rating of approximately 40 degrees, which means that it contains only about three grains of moisture per cubic foot, which has been found satisfactory in practically all bright annealing operations of any kind. Metal fittings thus treated require less polishing and can be produced in much more rapid time with this treatment.

Every such Servel application, most of them using absorption type gas refrigeration which is an enlargement of the Electrolux refrigerator, has been a highly specialized application for a particular industry. Specifications must be drawn up to include the size of the furnace, the number of cubic feet of blanket gas to be cooled per hour, and the pre-cooling temperature of available city water.

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*Save Rubber*

# Making the Most of Tire Mileage with Refrigeration Service

By JAMES A. DANIELS
City Refrigeration Service Co., St. Louis, Mo.

THOUGH the refrigeration service firm is of course entitled to obtain tires for essential food refrigeration service and other reasons, it's just as important that we maintain maximum economy on tire wear and observe minimum-mileage precautions as the motorist on his last set of tires for years to come. Until synthetic rubber is plentiful, the question of tire conservation should be the major interest with every service organization.

We've taken all steps possible with our fifteen trucks and automobiles serving far-flung St. Louis areas. First we have cut out entirely deliveries of parts and small items such as polish, ice trays, gaskets, etc., and put a stop to Saturday collections and deliveries altogether. When we received an order for parts which the owner wants to install himself, we now mail them parcel post and C.O.D.—which costs a little more but saves tremendously on rubber. Our men make every attempt to route the day's business in a straight line, and if the customer is too far off the route, we move her up to which ever will pass closest, no matter whose customer she may be.

By and large the most important thing we have done is to study microscopically ways of saving rubber wear. Cost is out now in favor of mileage—and we've set up a stiff set of rules which insures that our men get the very last inch out of new tires, used tires and retreads, all three of which we're using.

The first step which every refrigeration man should take is to make sure that he is using the *correct* type of tire. Where his cars or trucks carry heavy tool loads and parts loads, it requires larger size tires, or heavier plys. We move fast in our work, and have placed heavy duty five, six and multiple-ply tires on our cars to compensate for the heavy load which the driver often forgets he is carrying. With better tires, the heavy loads and high speeds on brick streets and highways which generate terrific heat inside the tire are less dangerous. Our drivers have been instructed to move at moderate speeds; but we're not kidding ourselves that this will be possible when the load of the summer months hits its full peak.

We maintain uniform air pressure in all tires and check it daily. Overinflation and underinflation are both bad. To minimize this trouble, we check often enough, and have made it necessary for drivers to pencil in a check slip at the end of each day stat-

ing whether he checked his tires. Hundreds of tires go out of service every day because no precautions were taken of this kind; and we don't propose to let carelessness injure our rubber.

## Causes of Failure

Overloading is the cause of a large percentage of quick tire failures. Normal flexing will go on almost indefinitely without injuring tires even at high speed—but when they are pounded under a 500-pound load of tools and parts, overflexing results which creates heat and weakens the cords so that blowouts or weak spots result. We will load only up to a set limit now in any car—if two heavy compressors are needed on one job, and the trucks aren't available, the driver must simply make two trips. Overloading results in tread wear, uneven patches on the tread, and bald spots which ruin a good tire in half or less of its ordinary life. Refrigeration men can find out from automobile dealers what loads their cars were designed for, and compensate them accordingly.

We have posted information obtained in this way on our bulletin board—showing that overinflation reduces deflection and tread contact area, increasing tension and strain on the cords so that a brick or stone in the road will break cords or bruise the fabric beyond repair. Slower speeds will obviate these for other firms, but for refrigeration service, speed is essential. Consequently, in addition to air-checking, our drivers must not use bumpy, rough or broken-surface streets, even if they must circle a few blocks out of the way. We show the overinflation also causes more curb cuts, more cracking, and cuts down on brake efficiency. Skid resistance where a heavy load of refrigeration parts are carried, is vital—and thus tire pressure has a second safety phase worth remembering.

A certain amount of extra pressure is built up in service, and should never be reduced by "bleeding" the tire. We found over-cooperative drivers were letting air out of their tires several times a day; a practice which we stopped by explaining that the tire will start overflexing again as soon as it is cool if bled, and will build up more heat. Tires can increase five pounds on a hot day's run without danger.

We have found that underinflation is equally bad. It doubles tire flexing, and results in excessive internal heat. Fast, uneven treadwear is the result of underinflation which wears the sidewalls badly. When we formerly checked tires only once a week, the damage often was done before noted. Now, the daily check eliminates any such danger. We use our own pressure gauges, more accurate than those in service stations, and maintain pressure at the exact point recommended by the tire manufacturer.

We have become "tire experts" through force of habit, now, taking out defective valve cores as soon as discovered, and using valve caps over the valve on all cars—something which we were inclined to forget about before. Valves are delicate and can start slow leaks from banging high curbs or accumulating sand particles. As soon as one of our trucks or cars shows an uneven wear on its tires, particularly on the front tires, we have the front and rear axles checked for camber and in-line rolling. We quickly put a stop to this nuisance, caused by wheels slightly out of line. None of our drivers hits curbs in parking now if it can be avoided, to prevent spring the wheel out of line. Seven of our fifteen cars have undergone this treatment since the beginning of the war, and better results are showing up at once.

## Rules for Drivers

Here are the rules which we have set up for all drivers in maintaining their cars or trucks:

1. Use correct size and type of tires. Too few plys mean sidewall breakage and excessive damage.

2. Never overload your car. If the load exceeds whatever passenger weight the car was built for, make two trips.

3. Check and re-inflate tires daily if necessary, and follow accurately the pressures recommended by the manufacturer.

4. Investigate sudden drops in tire pressure—it will usually be valve cores, inside cuts, or leaks which must be found by submerging the tube in water.

5. Never bleed tires of air when the pressure rises a few pounds on hot days. This only causes damage when they cool, and the tire is built for that change of pressure.

6. Remember that when heavy loads of parts must be carried without choice, inflate tires compensatingly—five pounds more for the heavy load than for the standard load. This protects every tire.

7. Never use boots, patches, innerliners or other substitute methods for vulcanizing or

repairing a broken casing. Boots will ruin tubes, as will blowout patches and other methods. When the tube goes, the tire is always damaged.

8. Always buy new tubes where tires are subject to frequent punctures. Often a bad old tube will quickly ruin a new tire simply because of frequent sudden strains on the tire when flats occur.

9. If flaps are used on trucks, buy the correctly sized flap and throw away all with cracks or bad pinches. Again the tube suffers.

10. Never pound a tire off a drop center rim with a heavy hammer without taking the wheel off. This will break the bead and ply fabric and is mere laziness which too many car owners practice.

11. Finally, keep tires clean from oil and grease by cleaning the garage floor. This will prevent weak spots in time. Remember tires are going to be hard to get.

# Rolling Refrigeration Plant for Passenger Air Transport

PERHAPS one of the country's most unusual refrigeration jobs is that of air conditioning the interiors of the 250 huge passenger airliners which carry passengers over the United States—a new field for refrigeration which General Refrigeration Corporation has developed for serving the transports of American Airlines in St. Louis, and United Airlines in Chicago.

Above the earth maintenance of the proper temperature in the big passenger ships has usually been one of heat—since the polished duraluminum surfaces of the fuselage and wings reflect actinic heat instead of absorbing the rays. Thus, the pilot has been able to keep the plane interior at the proper temperature by simply heating it with a small electric heater—enough cooling being supplied by the altitude at which the plane is flying. By flying higher or lower the plane interior can be given the exact weather conditions most comfortable for all concerned.

On the ground, however, with many more flights being made daily since the war began, and planes which ordinarily went into hangars now switching over immediately after landing to other routes, it has become necessary to use some form of comfort cooling and heating to prevent complaints and uncomfortable conditions. A metal plane standing immobile in the sun for half an hour or so will often be subjected to temperatures of 135 degrees or more, producing a "sweat box" condition which passengers cannot stand. At the same time a plane on the ground for a long period during bitter winter weather will become too cold for comfort. Finding that passengers refused to enter the transports until the last possible moment, both American Airlines and United Airlines contracted with General Refrigeration Corporation to supply auxiliary heating and cooling facilities. Because of the weight and unmanageability of the big planes on the ground, the system to be used had to be separate from the plane, and capable of easy movement from plane to plane.

The result is the "rolling refrigeration plant" pictured on the front cover, which both heats and cools all transports for both airlines. Built up as a complete, self-contained assembly, the cooling and heating equipment is mounted on a two-ton Ford truck body, and consists of a nine-ton GE compressor of 4 cylinders with a 3½ inch bore, a blower and mixing chamber, fresh air intake and condenser, and a hot water coil in the plenum chamber combined with four small electric heaters. All equipment is mounted on two removable steel beams which bolt on to the floor of the truck body, making it possible to remove the complete air conditioning unit with a chain hoist, for repairs or replacement. Power for all equipment except the electric heaters is provided by a power takeoff on the truck motor, which drives the compressor and blower, circulates hot water from the motor radiator through the coil for heating, and provides 1200 cfm of warmed or cooled air.

As soon as the transport plane discharges

its passengers, the truck unit is rolled up to the side and connected to the fuselage by means of an 8-inch rubberized fabric hose which locks on to a floor inlet. In the summer, the air conditioning unit draws in outside air through a grille on the left side of the truck behind the cab, cooled to 50 degrees with 35% relative humidity, and forced into the plane. A gasoline engine generator set drives the compressor during this operation, and also generates current for operating the blower and condenser fans. The cooling system is of large capacity to provide quick cooling for the plane, and does not require the use of outside power of any kind. It requires only 15 to 20 minutes to completely cool the plane to pleasant enough temperature to compensate for heat load on the ground.

For winter heating, the cold outdoor air is drawn in through the same grille and filters, and passed by the same blower through a chamber where a hot water coil and a bank of four electric heaters are located. Heating is actually accomplished by circulating hot water from the engine jacket through the hot water coil, and by switching current from the generator to the electric heaters. Individual switches for each of the four electric heaters enable the operator to control the amount of heat supplied to the plane. Maximum B.t.u. heating output is 135,000 per hour, cooling, 105,000 B.t.u.'s per hour. One hundred percent fresh air is used at all times, with a proper temperature of from 75 to 80 degrees obtained within a few minutes either in heating or cooling operations. Where the plane is kept on the ground for some time, the truck is kept in operation until the take-off.

General Refrigeration Corporation has built a dozen of these rolling refrigeration plants, which have been the means of removing one of the last important obstacles to passenger flying. Bodies for the trucks were made by Highway Trailer Company, Edgerton, Wisconsin.

## QUESTIONS AND ANSWERS ON ORDER L-38

THE following questions and answers have been prepared by the Air Conditioning and Refrigeration Branch in response to queries with respect to General Limitation Order L-38, which controls the production and distribution of air conditioning and refrigeration equipment.

1. Q.—Where a company engaged in the manufacture of ice cream, which furnishes ice cream cabinets, soda fountains or other refrigerating equipment to the retail dealers selling its ice cream, has extra equipment of that type on hand but not in use, and desires to repair or recondition it for possible future installation, must such company obtain a preference rating certificate of A-9 or higher in order to use parts already in its possession for that purpose?

   A.—Yes. Manufacturers of ice cream for resale, and bottlers of carbonated beverages, who install such equipment for their retail outlets, whether as a lean, sale, or otherwise, must comply with L-38 not only with respect to complete equipment but also with respect to repair parts. A rating of A-9 or higher, obtained in accordance with L-38, is therefore necessary before a manufacturer of ice cream can use repair parts, even though they are in his possession. Any such manufacturer or bottler who considers that compliance with the order would work an exceptional and unreasonable hardship upon him may apply for relief, by appeal, in the manner provided in paragraph (k) of L-38.

2. Q.—May component parts of the items listed in subparagraph (e)(1) of L-38 be used for non-emergency repair work except pursuant to such a rating of A-9 or higher?

   A.—No. Such parts may be used for emergency repair service only, in the absence of such a rating. The fact that such parts may have been in possession of the company when the order, or existing amendments, became effective is immaterial.

3. Q.—If a repair part for non-emergency repair or reconditioning work could be obtained by an A-10 rating under P-100, would such ice cream company still have to apply for and obtain a rating of A-9 or higher before it could use such repair parts?

A.—Yes. Under L-38 repair parts can be used only for emergency repair service or to fill a Preferred Order. How the parts are acquired is of no consequence.

4. Q.—If the repair parts were in the company's possession before Order L-38 became effective, can such parts be now used to convert a soda fountain from a "brine" to a "dry" unit, without first obtaining a rating of A-9 or higher?

A.—No. Such conversion would not be necessary for emergency repair service, and could not be undertaken. It would be immaterial whether or not the equipment in question might be of a type listed in subparagraph (e)(1) of Order L-38, or how long the parts may have been in the company's possession.

5. Q.—Can a *manufacturer* of ice cream cabinets deliver a cabinet to a prospective customer who has filled out form PD-1A and has obtained a rating of A-9 or better. You will note, we say, cabinet manufacturer, not dealer or distributor.

A.—A manufacturer of ice cream cabinets under Order L-38 as amended may deliver a cabinet to a prospective customer (but not to a dealer or distributor who has filled out form PD-1A and who has obtained a rating of A-9 or higher.) It should be understood, however, that a manufacturer of ice cream cabinets may *produce* cabinets only on a direct order for the Army, Navy or Maritime Commission, and then only until August 13, 1942.

6. Q.—Referring to Paragraph B, sub-paragraph 8, in Amendment No. 1, under the heading of "Emergency Repair Service." Is this paragraph taken to mean that if an ice cream manufacturer has an old cabinet at a dealer's, which is still operating, he cannot replace it with a new cabinet as long as the old one is functioning properly? Can he anticipate its being worn out or must he actually wait until the cabinet breaks down?

A.—Ice cream cabinets in the hands of an ice cream manufacturer, as of June 18, 1942, are free from the restrictions of L-38 and can be sold to anyone at any time as a replacement or in addition to a new cabinet. The term "Emergency Repair Service" as defined in paragraph (B-8), and as used in paragraph (E-3) of L-38 as amended restricts the sale of repair parts only and not of a complete ice cream cabinet.

## OVERCOMING MOISTURE IN FREON SYSTEMS

IN talking to one of our readers the other day who, incidentally, wishes to remain anonymous, he told of the good success he has had with the use of Calcium Chloride as a drier agent in Freon systems. This is against what is considered good practice in refrigeration work because it is generally considered dangerous to the system to use Calcium Chloride as a dehydrating agent.

Calcium, as is generally known, tends to dissolve after it has absorbed a certain amount of moisture, and tends to circulate with the refrigerant and oil. However, this informant states that in those cases where a small amount of moisture remains in the system and apparently defies other drying agents to remove it, he has had considerable success in making up a drier partly filled with absorbent cotton as a filter and the remaining part filled with Calcium Chloride.

Calcium apparently removes the small quantity of moisture in the system which so often is troublesome. It should be used only after some other drier agent has had an opportunity of doing its work or in other words should always be preceded by another agent which will remove the greater part of the moisture, leaving only a minute quantity for the Calcium Chloride.

## CORRECTION TO "TWO AND THREE STAGE COMPRESSION"

IN the article entitled "Two and Three Stage Compression," appearing in the July issue, a confusing typographical error appeared which should be corrected to read as follows:

Line 20 of the first column on Page 16 should read, "If the liquid is sub-cooled to —8° F." The temperature stated was —80° F., which is incorrect.

In the tenth line of the second column the word "stage" was omitted between the words "three" and " installation." This line should read, "Two and three stage installations. . . ."

# COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

## New Mid-Town Locker Plant for St. Louis

*By Robert Latimer*

RESIDENTS of St. Louis, Missouri, will enjoy locker plant facilities in the future without worrying about wear on tires and automobiles, according to H. C. Merry, president of the Merry Motor Company, an automobile dealership which has recently transformed its large Delmar Boulevard showroom into a 300-unit locker plant.

Mr. Merry and H. C. Fehl, former sales-manager for the automobile company, have planned for some time to enter the food preservation field, but had no opportunity to acquire space until war conditions unexpectedly made it imperative to switch into another line of business. Accordingly, going into partnership, the two men have remodeled approximately one third of the former automobile showroom to a capacious locker plant, containing six rooms, and "expose" to passing traffic the large windows formerly used to show automobiles.

"We believe the food locker business will be particularly important through the war," Mr. Merry said. "So long as it does not involve extensive use of automobiles by the customer. In the past, the customer has been forced to drive many miles from his home to make use of refrigeration of this kind, which would militate against the probable success of a new plant built outside the city. With our prominent location, close to most residential districts, and the fact, that we are served by several street car and bus lines, we expect to be able to operate a complete locker service without tires entering into the question at all. So far as it is possible, we are going to follow up all of our old automobile customers, informing them that we are now in the locker business, and attempting to sell them on the idea of becoming our locker customers as well." The plant, which is located at 5800 Delmar Boulevard, will be run contiguously with a somewhat limited automobile business, as Merry Motor Company continues to sell a few priority-rating automobiles.

The new plant, which opened May 18th, will rent locker space to housewives, and maintain a wholesale food department from which customers may choose meats, vegetables, etc., purchasing processing wrapping and refrigeration from the plant. A "food bank" system has been set up whereby customers will be furnished perpetual inventories of the foods on hand in their lockers, and notified when any type reaches a set minimum, which is up to the customer. Included in the facilities are a special room for fruit refrigeration, a "sharp freezer" and a washing and cleaning room. The sharp freezer will

maintain a temperature of 30 degrees below zero, and all lockers will be refrigerated to an average zero temperature. An innovation which Mr. Merry and Mr. Fehl feels will help the plant to reach its peak capacity immediately is "attendant service" —whereby women who do not wish to enter the cold locker room interior can call upon a delivery boy to do this work for them, at no extra charge. Circulars advising future customers of this service have been sent out, and are expected to eliminate a second drawback to locker operation.

Refrigeration equipment and lockers for the new plant were furnished by Hussmann-Ligonier, St. Louis refrigeration manufacturer, who contracted the entire job of remodeling the automobile showroom into an efficient locker plant.

# New Open-Face Refrigerated Dairy Bar Case for Super Market Speed

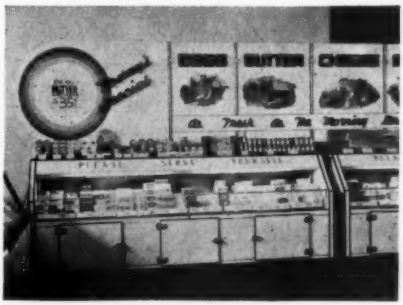
*By Herbert Hanley*

A FINAL problem in the way of high-speed food retailing has been solved at the Food Center Super Markets in St. Louis with the design and construction of a new type of "self service" dairy bar which, although refrigerated, is entirely open and convenient for the serve-yourself customer.

As pictured, the case is 11 feet long, and has the double advantage of eliminating the necessity of the customer sliding back heavy glass doors, and encouraging her to buy several refrigerated dairy products simultaneously. "This part of our markets was formerly a bottleneck," A. J. Molaskey, president of the super market chain said. "It was nothing unusual for customers to line up in front of the former dairy bar to extract merchandise, particularly during rush hours. With our new open case, it requires no more effort to select two or three dairy products than it does to remove a loaf of bread from the bread rack."

The case was worked out by Mr. Molaskey, in combination with Hussman-Ligonier Mfg. Company of St. Louis, primarily to meet the "speed" requirements of mass food merchandising in the eight markets operated by the Food Center Company. One of the largest super market chains in the middlewest, the Food Centers are founded on high speed service and low prices—a pattern into which the new case has fitted ideally.

There is a 30-inch opening along the upper face of the case, which slants back at a 35 degree angle. A low glass panel at the lower edge serves to retain merchandise without hiding it in any way. Shown



**The open face refrigerated dairy bar case shown here provides easy access to the goods stored thus speeding up service**

are packaged cheese, sliced cheese in cellophane wrappers, and lard, butter, oleomargarine and eggs. A 36 inch shelf with a step at the rear of the case will show as much merchandise as the former upright case, every item at arm's length even in the extreme rear.

Refrigeration is provided by two banks of coils along the upper surface of the case, concealed by a slight canopy. Operating from a compressor in the basement, these coils circulate refrigerant at high speed, forming a blanket of cold air over the dairy products on display of approximately 45 degrees. The location of the coils also has the effect of forming a "ceiling" of colder air through which the warm air of the building does not penetrate. (All Food Center markets are cooled by evaporative air conditioning.) Tests show that even at peak periods when one thousand persons are in the market, temperature remains at low enough level to protect perishable foods. For reserve stock, each of the two cases installed has three 4 cubic foot refrigerated cabinets. The more perishable cheese, including a daily "special" of sliced bulk cheese packaged in ten, fifteen and 25 cent cellophane wrappers, are shown in porcelain trays atop the floor-level storage cabinets, thus retaining cold underneath as well as over the stock.

The new style refrigerated cases are located to the right of the meat market, where the customer can step from the meat case while her purchase is being cut and wrapped to the dairy bar for cheese, butter, etc. Three units consisting of two cases each have already been installed in Food Center stores, resulting in 50% quicker turnover of dairy products customers.

# Kansas City Stores Tell Owners to Sell Their Own Old Refrigerators

*By Bob Lockhart*

THIS publication during the past few months has treated thoroughly the subject of how reconditioned refrigerators may help to bolster volume dropping from new-appliance shortages. Dealers may ask, however, "How about the dealer who hasn't a service shop, and can't get the work done economically enough to make a worthwhile profit on the old trade-ins?" In many cities, of course, refrigerator-reconditioning shops are so tied up with work for larger dealers and private customers that the dealer can't get his work done.

What appears to be at least a partial solution has been developed in Kansas City, Mo., where a group of smaller appliance dealers have for the past three months refused to accept trade-ins—asking the new-refrigerator customer instead to move the old box down in the basement, and sell it through the newspaper himself. Nine dealers cooperating in this plan have found that they can realize a larger profit on every sale of scarce new refrigerators, eliminate completely the worries of making allowances, transportation, etc., and at the same time do a larger cash business.

Naturally, a goodly number of sales are lost when prospects find that the store doesn't want to make allowance at all on their old boxes. "I lost 18 customers in a month's time," one dealer confessed with a grin. "But now that there are more customers than merchandise, that isn't much of a problem. We find we can sell the idea to the owner by offering a little cooperation, such as writing a good classified ad for him, helping to clean up the refrigerator, etc. We point out that the bargain-minded type of customer who shops through classified ads for his appliance always has a lot more confidence in the owner than he will in a dealer, and that the home owner can thus sell his old refrigerator for from $10 to $15 more than we can reasonably allow him. For example, I recently sold a $220 7-foot refrigerator to one man who had a seven-year-old 6-foot box to trade. I told him that I

could give him $20 for the box, but that I had no way of reconditioning it for sale, and that I was certain he could get $35 or $40 for it by advertising it for sale in April or May, when warmer weather came along. The man accepted the terms. About April 5th he called up to tell me that he had sold the refrigerator for $45.

Biggest advantage of this idea, of course, is that no strings are attached to the new-box sale. There is no haulage charge, no reconditioning expense, no advertising, and no risk in making an over-large allowance. "Everybody actually benefits" another dealer said, "although we may lose a potential extra few dollars profit by not handling the trade-in, the higher profit from the new unit more than makes up for this."

This plan grew up largely through the fact that Kansas City's service shops are swamped with work, and few smaller dealers feel justified in spending the money for a reconditioning shop even if machinery was available. All dealers are pleased with its results.

# Refrigeration Equipment Company Switches to Service and Re-trains Salesmen as Servicemen

*By M. F. Diettrich*

REFRIGERATION EQUIPMENT COMPANY, commercial refrigeration and air conditioning dealers in Baton Rouge, La., have switched over all facilities to service, including even re-training salesmen to do service work, according to Morris Faures, head of the firm.

The company, handling Friedrichs display cases and commercial refrigerating compressors, Carrier equipment and air conditioning, Copeland and Stewart-Warner parts, eliminated a small household department entirely last January, disposing of the last home refrigerator before the freeze. "In the future we are going to concentrate on replacement of existing commercial refrigeration and service," Faures explained, "even if we have to put everybody on the staff to doing service work. I'm back at the job with tools myself—something I thought I'd never do—and enjoying it more than I had suspected was possible."

Refrigeration Equipment Company has been in business for ten years, and has around 500 commercial installations in Baton Rouge. In the past, Faures contracted most service and warranty work to outside firms, including distributors, refrigeration service men, etc. Now, with curtailment of many sales possibilities, the company has opened up its own service department, with new equipment, larger shop, and converted part of the showroom into a dispatcher's office. For all service, the company has set up a base rate of $1.75 an hour plus parts—25c more than was standard before. Work will be split equally among installations of replacement equipment, commercial and air conditioning repairs, with no contract service accepted.

"We will continue to get enough commercial equipment and replacement parts to keep our sales department alive," Faures said. "However, it will take only one man to hold up the sales end, so that we are retraining the salesmen to do service work." Personnel being the toughest job, Faures thought at first that the salesmen, used to easy hours and no manual labor, would be hard to convert—but by setting the example by donning a uniform himself, he has had less trouble than expected. One man was lost to the army; but the remaining three are all learning service "from the ground up." Every salesman knows enough about the refrigeration he sells to be able to grasp the details of servicing it quickly; in fact, two

# VICTORY!

## A SHORT, SHORT STORY OF

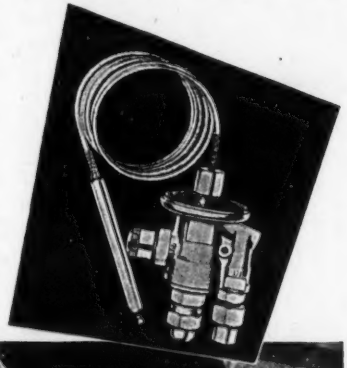
## *the breakfast table .. dependable valves and* YOU!

Victory starts at the "breakfast table"—with good nourishing food that puts fight, and courage, and strength into soldiers and workers alike.

Refrigeration Equipment, keeping this food fresh and healthful, is serving an important Wartime duty . . . And must continue to do so WITHOUT REPLACEMENT PARTS AND EXPENSE if possible.

To YOU, Refrigeration Service Engineers, this offers a distinct challenge to skill and ingenuity. When you MUST use A-P DEPENDABLE Valves to help you, your Industry relies upon YOUR judgment in buying these Valves and other parts ONLY AS ABSOLUTELY NEEDED.

It's our Victory effort to see that all metals, materials and man-power be concentrated on Weapons of War. We know you will cooperate.



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FOR VICTORY
BUY
UNITED
STATES
DEFENSE
BONDS
STAMPS
DEPENDABLE
Refrigerant Valves

of the men answered calls within two weeks after starting "to school." They are being trained by Faures himself, and by manufacturers representatives who spend a day per week at the company headquarters explaining the details of this and that work. Faures explained his plan to each manufacturer, and got valuable cooperation in that way.

Faures doesn't believe that he will have to do much selling as long as the war lasts. Most of his meat plant, produce house, meat market and large grocery store installations are replacing their equipment wherever possible, and appear glad to get the equipment. Consequently, the money spent for advertising in the past has been diverted to refrigeration and air conditioning parts. Service work may not entirely compensate for the loss of sales, but combined with replacement sales, refrigeration for defense factories and army camps nearby it will keep Refrigeration Equipment Company very much in business tnrough the war.

## Supply Firm Sets Up "Rationing" System of Own

*by Donald Delayen*

WITH the number of refrigeration service firms in operation multiplying rapidly, and a heavy demand for parts on all sides, it's going to be necessary for the refrigeration supply jobber to set up his own "rationing system" to make sure that he serves everyone well, according to Leo S. Bosarge, head of the Leo. S. Bosarge Company, New Orleans, La. "The supply firm can put itself out of business by accepting too many orders without question, or attempting to glean all the business possible at once," Mr. Bosarge grinned. "A lot of service firms quite naturally are anxious to stock up on parts for the tough months ahead, and represent our chief problem."

The Bosarge organization, supplying parts for both domestic and commercial refrigeration for several years to New Orleans's two dozen authorized or well-established service firms, has found many new markets springing up—including appliance dealers going into service as a panacea for the lack of business coming from new appliance sales, plumbing and heating firms cut off from their former sales and converting to air conditioning and commercial refrigeration service, and even automobile agencies taking up the field. All such firms want parts, and are willing to pay for them. Nevertheless, Mr. Bosarge will not sell parts indiscriminately without at least a look into the siuation.

Since early January, the Bosarge company has been "rationing" out its parts on a close-check system. Every firm which has been buying for several years will receive its customary orders without question, and even an excess amount, if not too large, to take care of the larger volume of business which is natural. Otherwise, when ordinary orders suddenly jump to two, three and five times their former size, a Bosarge representative looks into the matter, even going out to interview the ordering firm to discover why so large an order is required.

The order isn't sent until the okay comes back from the representative. If he finds that the service firm is ordering out of "fright" or to protect itself against price advantages or shortages, it is explained to the customer that if he does get the larger amount of parts and supplies, someone else will have to suffer for it—simply because the Bosarge supply firm cannot itself receive sufficiently large extra orders to compensate for it. The customer is told that the firm will attempt to keep up stocks concurrently with the demand, and that it will guarantee to supply them wherever possible. If these arguments still don't convince the refrigeration service man, his patriotism is invoked—pointing out that "hogging" of available parts will work a real hardship on the industry.

Of course, if the firm has a defense construction installation job, or is supplying a strategic need with repairs or new installation, there isn't any question about it. Otherwise, the Bosarge firm adamantly says "no" and settles the order with a reasonable amount of supplies. Such a plan is absolutely essential, Mr. Bosarge is convinced.

## *A Timely Observation on what changes War Conditions will bring about for the Service Man and Wholesaler*

# From Replacement to Repair

By E. L. TRAMPOSH
AS TOLD TO B. K. ANDERSON

*(Editor's Note—"Ernie" Tramposh is the Midwest's nearest approach to the title of "Boy Wonder of the Refrigeration Service and Equipment Field." An associate member of the Kansas City R.S.E.S. and a past president of the Midwest Jobbers Association, Ernie started his own Refrigeration Equipment Company in Kansas City when he was 25 years old. Now, at 28, he heads his company, which is one of the largest in its area. Believed to be the youngest equipment jobber in the country, he says of himself: "Three years ago I started out with nothing except a good strong affection for everything connected with refrigeration." Today he has one of the area's largest stocks and frankly admits "It's all clear!" At the time this article was written, he had just returned from a meeting of the Midwest Jobbers Association and a trip that included contacts with scores of refrigeration service firms throughout the Midwest.)*

THE days of the screw-driver mechanic in the refrigeration service industry are drawing to an end. And I hate to say this because I'm a jobber of parts and equipment, but during the past few months I've traveled thousands of miles, just to see persons in the refrigeration industry, and the more I traveled the more I have become convinced of one thing: *refrigeration service is slowly being turned from replacements to repair.*

Certainly, it goes without saying, that I wouldn't make a statement like this without feeling it to be unalterable fact. It means that refrigeration equipment jobbers too are going to have to do some replanning of their business—some very important replanning that in many cases is going to call for the addition of shops to their operations.

Why is it going to be necessary for some jobbers to add shops? Just why can't it be left up to the Service companies to do all this work?

Ernie Tramposh is pictured at left with B. K. Anderson at right

The answer to that is much simpler than it appears. Right now in the Midwest area there is the greatest shortage of experienced refrigeration service men that the area has ever seen. Most of those who have left this work have gone either into the Army or into war work. Consider a minute the attraction which work in war plants holds out to these men: In this area they go to work on jobs that pay them much more than they earned in refrigeration. They work regular hours without transportation worries. In many cases they will be deferred from combat service, at least temporarily, because of this work.

Now look at the other side of the picture: In the past refrigeration service has been

to many of them a gamble as to earnings due to its highly seasonable peaks. They have worked all hours of the day and night never being sure when they could get home to a meal or be able to keep other engagements. And lately they have had to worry about tires and gas rationing. Many of them frankly admit that war plant work offers them a release from the majority of their worries and they've gone into it by the hundreds.

## Jobber Repair Shops

So, I believe, some jobbers may be forced to add repair shops to their service simply because the service companies aren't going to have time to make these repairs themselves. Of course, this isn't going to make any of the jobbers I've talked to happy because it throws them into competition with themselves—a condition they may have a hard time getting readjusted once the war is over.

To be honest, the jobbers would like it better if the service companies could somehow find themselves able to equip shops to the extent that they could repair parts of which shortages exist in the present and future market, but there are very few shops of this sort now in the area and the shortage of experienced help to operate them is even greater.

However, a large number of refrigeration service companies are now putting in shops and my advice to all who can is to do likewise. There are several ways to go about this. First, most firms should decide on their specialty. In other words it would be too difficult and too expensive to try now to start from scratch and get such a shop together as would be suitable for all types of repairs on all types of refrigeration equipment.

In most lines shortages that now exist and are likely to exist are apparent. If you don't know what they are, you better see the firm that supplies you and get their opinion. Then your shop can be planned to the type of repairs you know you are going to need in the immediate future.

Next you need a blueprint on how to repair these parts and how to use your shop equipment. The best source of this information that I can recommend to you is your old file of THE REFRIGERATION SERVICE ENGINEER. If you haven't kept these in a bound file you better look them up and begin your file now.

Then comes the question of what to repair. This can be answered most easily in face of the following facts. Can you get a replacement from your jobber? Can you guarantee the repaired part to your customer. Are you so far behind on your service calls that you can afford to stop now and repair the part?

Broadly, I believe the following considerations should be taken into consideration: Wherever replacement parts have been used in the past, and are obtainable today, this form of service should be continued. In instances where parts aren't obtainable, but may be at some future date, the customer should be told that the part is being repaired so that he will not suffer loss of use of his equipment, and that replacement will be made as soon as possible. Certainly this is going to cost the customer more—which explains why he should be consulted in the matter which might otherwise lose the service firm his good-will and confidence.

## Time Is Main Factor

Then there is the matter of time. Can the service firm, a week behind on its service calls, afford to stop and repair a part of which there isn't a replacement in the market. Personally, I believe this should develop into a matter of shop scheduling. In other words each firm can set apart or plan ahead a certain amount of its time for shop-repairs. This planning should be done with an eye to keeping service calls on schedule.

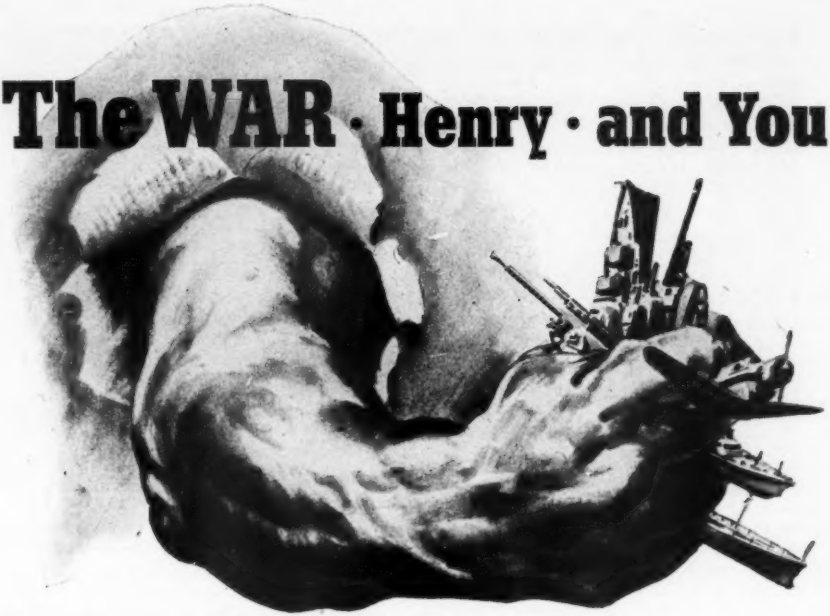
Several months ago in both the service and supply fields of refrigeration the idea shared by most firms was, "We'll get along somehow." But recently it has been my experience that most progressive firms are convinced that in the months directly ahead lies the "Testing Period" for all branches of our Industry—and our success or failure will depend upon the amount of effort and willingness we put into the problem of keeping the largest possible number of refrigeration units operating in the face of adverse circumstances during the war period.

What these circumstances are and are likely to be—according to the opinions I have encountered at conventions and meetings in late weeks—are:

Much domestic work may have to be passed by because of our inability to get replacements and due to increased needs of commercial jobs for which it appears we will have adequate replacements.

Refrigeration service will not experience

# The WAR · Henry · and You



## Changed Conditions REQUIRE Changed Sales Thinking!

IN WORLD WAR I refrigeration and air conditioning were not very important factors. Today, they are vital necessities for our armed forces—on land, on and under the sea and in the air. And, because Henry Products are preferred they, too, follow the flag on every front, wherever refrigeration and air conditioning are used.

World War II has shut off supplies for many civilian needs, including Henry Valves, Strainers, and Dryers. Yet this same war has created a new and lucrative market for refrigeration and air conditioning equipment in war producing industries.

The larger installations are, of course, beyond the scope of the local contractor. But there are scores of applications which he can handle at a profit—if he will go after the business.

War plants are now using refrigeration for cooling cutting oil, quenching oil, and welding electrodes; air conditioning for testing and drafting rooms, and many other applications.

Educational and aggressive sales effort is necessary to get this type of business—it doesn't come in over the phone or over the counter. Study your local market—determine what is needed—and sell the jobs, which usually carry high priority ratings. You'll help win the war and maintain your own business till happier days are here again.

### ★ OTHER INTERESTING WARTIME REFRIGERATION APPLICATIONS ★

**Abrasives. Airplane Parts. Bacteriological Cabinets. Blood Coolers. Canteens. Glass Processing. Instruments. Laboratories. Metal Shrinkers. Governmental Agencies and District Offices. Oil Viscosity and Congealing Testers. Photographic Film. Plastics and other Synthetic Products. Parachutes. Optical Grinding Rooms. Rivet Coolers. Test Cabinets. Retail Stores and Restaurants in Defense Areas.**

# HENRY VALVE CO.

1001-19 NORTH SPAULDING AVENUE, CHICAGO, ILL.

PACKLESS AND PACKED VALVES • STRAINERS • DRYERS FOR REFRIGERATION AND AIR CONDITIONING
AMMONIA VALVES • FORGED STEEL VALVES AND FITTINGS FOR OIL, STEAM AND OTHER FLUIDS

off-season letdowns. Due to shortages of help and replacements, service firms will be kept at operational capacity the year around.

Although customers are going to be anxious to pay more for their service than in the past—because they are going to have to wait longer for it and are not going to be able to go out and buy a new unit when their present one fails in operation—a better selling job must be done by the service man in that he must explain to the customer that it is not possible in all cases to guarantee the same satisfactory service from a repaired part that is possible with a new replacement part. The customer is going to have to be told the actual conditions as they exist in the industry.

## Service Policy to Change

There can be no more gambling in taking on jobs on a flat-price basis. Each firm is going to have to make certain of its profit on every job because competition, as we have known it in the past, is not going to be a matter of any importance in the market directly ahead of us.

Customers are going to have to wait for service now, and firms should be drawing up plans to make this explanation an automatic function of their firm's so that much valuable good-will will not be lost. But rigid schedules should be setup and kept to so that confusion can be avoided and good-will of customers maintained.

It is most important that morale within the service companies themselves be maintained. It should be explained to all members that certainly the shortage of some parts has caused inconvenience but they aren't being missed as much as we thought they would be a few months back. In most service companies where earnings have increased considerably, as they have in most cases, bonuses in War Bonds are a great morale builder—and this is important now because the men are working longer hours now under very trying circumstances. And don't forget, war factories are holding out very attractive offers to men trained in mechanics.

Perhaps the most important factor in the training of new help is to point toward the one goal: How can I get this man into production in the shortest possible time? More new help is needed now than ever before and there is less time to train it. Therefore it becomes necessary to specialize in "Line" types of training. The new man must be trained to do a few simple types of work and kept on them alone until conditions and his own development permit greater latitude in his work. By showing him that refrigeration service offers him a future exceeded by no industry and equaled by few in both sales and service, he can be put in the best possible frame of mind to learn this business.

Another morale factor that should be common knowledge of all refrigeration service company employees is that there is enough equipment now in the field to keep all of us in business going even without new installations provided we can find means of repairing parts which aren't available to us in the market.

Certainly we should aim at rigidly limiting our overhead and maintenance costs in the face of a market that is making everything more expensive.

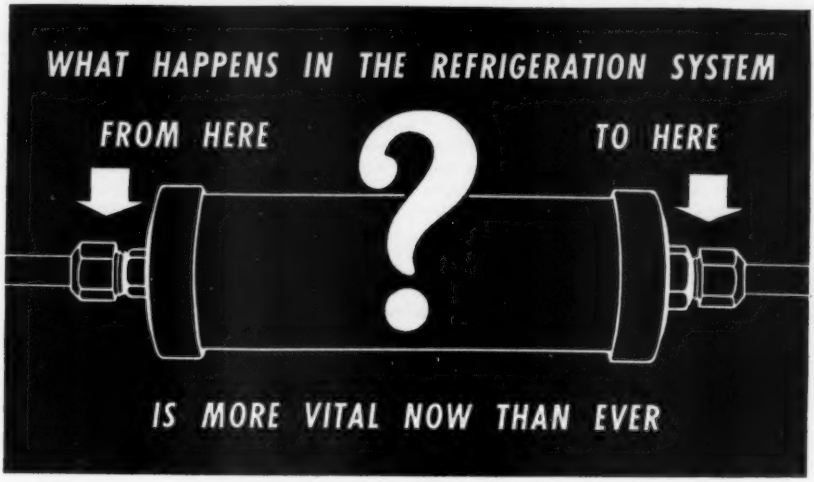
## Conservation of Material

Salvage should also occupy a prominent place in every service firm's program. If, as most firms seem headed toward, specialization has been accomplished, then the firm should as soon as possible obtain for salvage purposes as many old and recent models of those special makes as possible. These salvaged parts, of course, must not be sold as new but they can be used as both "loaners" while the broken-down part is being repaired or as "replacements" when the defective part can not be repaired or replaced from the jobber's shelves.

There should be a storage of all defective parts, unless repaired and replaced, in all service company offices or shops. It may soon be necessary to work on a basis of exchange on even repaired or renewed parts.

Most of all the service company should remember that it wants to be in business when this war is over. It should realize and take into consideration that it is going to have to work longer hours, that in many cases customer relations aren't going to be as pleasant as they have been in the past. *Good will must be preserved at all costs.*

I feel sure that the lack of parts will not run the service firms out of business, it will simply give them more to do. And further there is no reason for any service company to stop its sales efforts now. There are many special items that can be handled in any volume. A couple of them that have proved good in the Midwest recently are Blood Plasma Cabinets and Electric Mortu-




An efficient dryer makes a world of difference in the service a refrigeration system gives. Trouble with frozen valves is avoided. Wear is reduced and corrosion prevented. Alorco Activated* Alumina is that kind of dryer.

To a nation at war, it is vital today for the serviceman to anticipate and prevent refrigerator shutdowns. Cartridges and dehydrators charged with Alorco Activated Alumina, inserted in the refrigerator lines you service, keep the refrigerant DRY, clean and free from acid. They help you head off trouble.

Activated Alumina removes every trace of moisture, to dew points below —110° F. It also removes acid and sludge. Dehydrators and cartridges charged with this efficient, dependable drying agent can be obtained through your supply house.

Be sure to ask for genuine Alorco Activated Alumina. ALUMINUM COMPANY OF AMERICA (*Sales Agent* for ALUMINUM ORE COMPANY) 2159 Gulf Building, Pittsburgh, Pa.

**These manufacturers supply cartridges and dehydrators charged with Activated Alumina:**

American Injector Co. . . Fedders Mfg. Co. . . Henry Valve Co. . . Imperial Brass Mfg. Co. . . Kerotest Mfg. Co. . . McIntire Connector Co. . . Mueller Brass Co. . . Cyrus Shank Company.

ALORCO

*Registered T. M. U. S. Pat. Off.

ary Refrigerators. Of course, there are many other special units of every nature that it will pay most firms to find out a little about. If for no other reason than to keep the selling-idea alive, a few of these items should be carried and sold at regular intervals.

As I said in the beginning refrigeration service firms are entering an era when they must shift their service in many instances from replacement to repair. Tests have proved that nine-tenths of the parts that fail in service can be repaired in a light machine shop. Even though all the dealers in the Midwest area were able to set up shops for the repair of parts they couldn't possibly take care of the needs of their customers. Now less than 5 per cent of the Midwest's refrigeration service firms have shops adequate for this work—and it must be remembered that there is very little in the way of repaired parts for domestic units available. We're going along on our backlog, our margin. One day in many lines this will give out. The firm whose shop is in order and operating at that time will save itself a great deal of trouble and will gain a vast amount of good will with its customers.

## WESTINGHOUSE TRAINS 8,000 RETAIL MEN ON SERVICE

SO that users of some 30,000,000 Westinghouse appliances can continue to enjoy the best possible service from their equipment, the Company's Merchandising Division has just completed a national series of 300 service training meetings in which 8000 representatives of dealers handling Westinghouse appliances were given a full day's schooling in all phases of service.

**WESTINGHOUSE HOLDS SERVICE MEETING FOR DEALERS IN ROCHESTER, N. Y., AREA** In one of the 300 service meetings held for Westinghouse dealers nationally, Don Wetmore, Service Supervisor for the company's Eastern district conducts the all-day session with the help of Westinghouse Electric Supply Company's personnel at the branch house in Rochester. These meetings recently completed, covered all phases of the dealers service operation.

For years factory service schools have been presented to Westinghouse dealers throughout the country, but this 1942 series of meetings, just completed, was more inclusive than those of the past. At central meeting points throughout the territories served by more than 100 Westinghouse distributors dealers assembled to hear not only the perennial "how to fix" type of information, but also newly developed help on how to analyze a local service market, how to set up a service organization to meet wartime conditions, and suggested methods to promote more service business. These meetings were presented by both factory and distributor personnel.

In launching the activity L. K. Baxter, Westinghouse Merchandise Service manager, called the company's 17 district service supervisors from all sections of the country into the factory for three days of intensive training. They were given meeting guides with verbatim scripts to learn and properties to use in staging the schools. They were equipped with charts covering the major points of the meeting and a sound slide film, titled "Can You Make It Better."

Fortified with their properties and a "canned" script these men returned to their districts and held model meetings for their distributor service personnel who were later to join them in carrying the "message" to the Westinghouse dealer organizations.

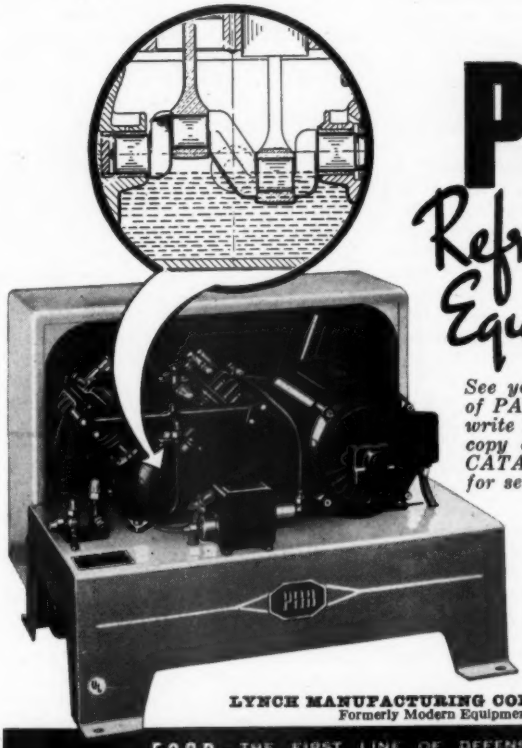
Lending a helping hand in this major training program were the Sales Development managers of each of the company's districts. They were the promotional men who in former years were responsible for staging dealer previews and sales training programs on newly introduced products. With the end of civilian goods production in sight the training experience of these men was diverted to this important service training channel.

One section of this meeting covered with charts the "nuts and bolts" story of the product. With merchandise on display in the meeting rooms some of the products were taken apart and put back together again to illustrate the solution to some of

# OILITE BEARINGS
# On All Par Models!!!

**PAR compressors use genuine Oilite crankshaft bearings . . . the pioneer-quality, porous bearings that insure constant, effective lubrication and assures the user trouble-free performance for long years of service.**

**This feature is typical of Par's careful attention to important engineering details—such details as 3-ring pistons . . . bulls-eye oil gauge . . . drop-forged crankshaft . . . full "commercial-type" controls. These give maximum efficiency at minimum operating costs.**



## PAR
## Refrigeration Equipment

*See your jobber's display of PAR equipment . . . or write the factory for your copy of the FREE PAR CATALOG "R", a manual for service engineers!*

**LYNCH MANUFACTURING CORP., Defiance, Ohio**
Formerly Modern Equipment Corp.

★ ★ FOOD - THE FIRST LINE OF DEFENSE CONSERVE IT WITH REFRIGERATION! ★ ★

the repair problems. The use of charts was an innovation in presenting a service school on the mechanics of the product.

Not stopping with just a service product presentation, the speakers covered thoroughly the problem of handling service calls. Using for the first time a film devoted entirely to service, the picture, "Can You Make It Better," illustrated the right and wrong way for a service man to conduct himself on a call. Introducing such characters as "Willie, the Worryer," "Lazy Louie," and "Trailblazer Tommie," the film gave a humorous punch to the meeting and dramatically registered its points.

At the conclusion of the full day's school all attending were given questionnaires based on the material presented. Those successfully answering the questions were eligible for membership in the newly organized "Qualified Service Men's Club," an honorary organization.

# WPB Curtailing Civilian Goods

A NEW survey of WPB orders issued during the first six months of 1942 shows that hundreds of household items once considered almost in the essential class have already been taken off the nation's production lines and that, when present inventories are gone, citizens will have to turn to substitutes or "make do" with what they have.

High in the list of these articles are numerous electrical appliances, ranging from such relatively essential items as refrigerators and ranges to luxury items like waffle irons and hair dryers.

These products were manufactured in some 28,000 plants located in all parts of the country in which were employed some 1,500,000 workers. The factory sales value of the civilian products manufactured in these plants last year was approximately $3,800,000,000.

Several million tons of steel, copper, brass, aluminum, rubber, plastics and other materials were consumed annually in the production of these civilian products.

Now the bulk of that material will be saved for use in the war program. In fact, the same factories that formerly used these metals in the manufacture of refrigerators, radios, washing machines, and the like, are now using the same materials, the same tools, and the same workers to make guns, airplane parts, tank parts and many other weapons of war. Many of the plants are already turning out a greater volume of war weapons than their peak production of civilian goods.

Civilian production of the following goods has already been stopped: electrical appliances, domestic oil burners, mechanical refrigerators, domestic washing machines and ironers, electric ranges, most of the non-electric cooking ranges and heaters, electric fans, metal household furniture, radios, sewing machines, vacuum cleaners, lawn mowers, and such luxury items as musical instruments, golf clubs, fishing tackle and outboard motors.

Production of an equally long list of everyday household articles has been sharply cut, with all but the most essential of them due to go out of production entirely as soon as fabricated parts have been used up.

Among the consumer's durable goods industries which have been affected are: domestic mechanical refrigerators.

## Domestic Mechanical Refrigerators

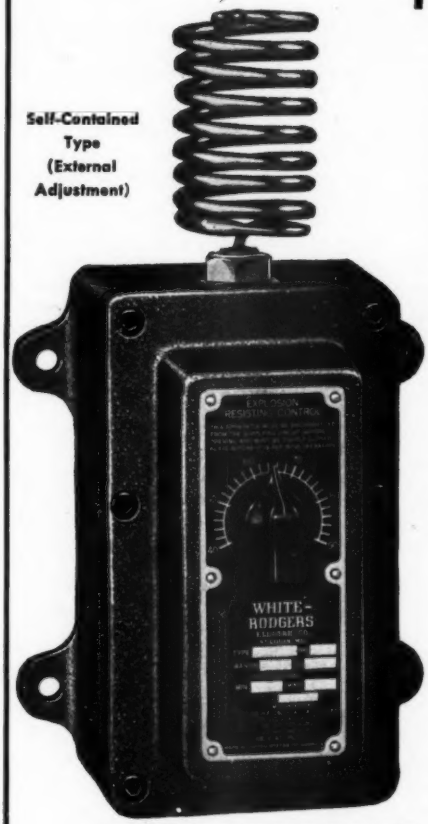
Production of stopped on April 30. This was the largest of all the consumer's durable goods industries. In 1941 it produced 3,700,000 refrigerators with a factory sales value of $280,000,000. The stop-production order will result in annual savings of 375,000 tons of steel, 18,000 tons of copper, 18,000 tons of aluminum, 4,300 tons of rubber, 250 tons of nickel, 850 tons of tin, 2,400 tons of zinc, 450 tons of lead, and 5,000 tons of plastics. In addition the entire production capacities of the industry will be converted to war work. The industry consists of 20 companies with some 36,000 employees. When fully converted, war production will exceed its peak civilian production. In fact, war contracts are expected to run between $500,000,000 and $750,000,000 annually. By September of this year the industry is expected to have 36,000 employees engaged in war work the same as its peak peace-time activity. By April of 1943 this is expected to be increased to 70,000 employees. Airplane parts and assemblies, and ordnance are among the war weapons already being manufactured in the former refrigerator plants.

# WHITE-RODGERS

# EXPLOSION-PROOF

## THERMOSTATS

Self-Contained Type (External Adjustment)




These new White-Rodgers Explosion-Proof Thermostats are line voltage, Hydraulic-Action Controls designed for refrigerating, air conditioning and heating applications where hazardous conditions exist. Especially recommended for use in oil refineries, munitions plants, cleaning plants and similar locations.

Underwriters approved, both self-contained and remote type controls are available in standard ranges to cover any type of application.

**WHITE-RODGERS ELECTRIC CO.**

**1203h Cass Avenue, St. Louis, Mo.**

# The Question Box

**Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."**

## MORE ON QUESTION 489

IN your June issue there is a question (No. 489) to which I can probably add more information. Your inquirer is having Frigidaire troubles on low voltage. Since the voltage is consistently low—although it does vary, too—Frigidaire, in their old refrigeration bulletins, describe a remedy.

For instance, in their bulletin of January, 1939, Volume XIV, No. 1, Page 26, they describe a transformer with a slight stepup ratio. They say, "This is sometimes referred to as a voltage adjusting transformer and is used to add or subtract, approximately 15 volts to or from the line voltage. This furnishes voltages within the required operating limits of a 110 volt motor (105 volts minimum and 125 volts maximum)." (In your inquirer's case it would be advantageous to use transformers with a 20 volt stepup.) "When the available line voltage is as low as 95 volts, a transformer may be used to add approximately 15 volts, bringing the voltage up to 110. . . . It has enough capacity for any motor up to and including ⅓ hp.

"This transformer, however, will not produce proper operating conditions where line voltages vary widely during the day and is applicable only where the line voltages are either constantly high or low."

Since the trouble is with the line voltage continually being below the allowable operating limit, such a transformer is advisable. The Frigidaire transformer would be suitable on some jobs but a transformer could probably be made up with a 20 volt secondary to work on all conditions. In getting another make of transformer it is necessary to remember that starting voltage on those motors is some 13 times as much as the running wattage and some allowance made for that.

All of the above comments are for the condition where the line voltage is low but not depressed excessively by the starting current of the motor. In the cases where the voltage drops 10 or 15 volts when the motor starts and as the unit reaches full speed and the line voltage comes back to its original value, a different procedure is to be followed. Please note the two *different* conditions, although they are both low voltage conditions.

In the second case a condenser is supplied by Frigidaire to enable proper starting. It will take care of not more than a 15 volt drop but is a good scheme. Notice in the following quotation that it is suggested apparently as an afterthought that it might be good in low voltage conditions. In practice it helps a great deal.

Quoting Frigidaire's circular letter No. h-78, October 17, 1938:

". . . is an electrolytic capacitor hooked up in series with the starting windings. These capacitors are to be used for the purpose of reducing any electrical hum, thus lowering the noise level.

"Reports received thus far indicate that these capacitors not only reduce electrical hum but also reduce starting noise which is objectionable to some users. In some instances where a slightly low voltage condition exists, they have been of material benefit."

The part number of the transformer is 1125065. The capacitor number is No. SA50241.

In speaking of capacitors, maybe a review in your magazine of the Aerovox Industrial Capacitor bulletin could be made. I gleaned from it a simple test for capacitors on the usual capacitor starting motor; that is, the capacitor must be able to start the motor in less than 3 seconds and yet develop less than 138 volts across to terminals during the starting period. It's simple and yet accurate—no fussing with capacity meters.

The book "Fractional Horsepower Motors," by Vernott, could be profitably studied by refrigeration service men.

On Page 16 of your March issue you have an article on chemically cleaning condensers and evaporative coolers. Last year in our air conditioners we cleaned the condensers mechanically and swore at every one. We learned about the method described in the above article and inquired of Grasselli's Chemical Company about the inhibitor powder and were told it was not sold separately, but that they sold the acid and inhibitor.

# IT'S PATRIOTIC TO USE THAWZONE

## *because:*

● No metals, so urgently needed for the country's war program, are required in the use of THAWZONE.

● It protects refrigerants which are being conserved by the government. There are no dilution-of-refrigerant worries when THAWZONE is used. Only 1 part (by weight) to 150 of refrigerant. (1 to 300 for hermetic units.)

● The protection of essential equipment is a real patriotic duty right now. THAWZONE destroys moisture and neutralizes acid, thereby protecting the vital functioning surfaces of refrigeration units.

● THAWZONE is the only **moving** drier, dehydrator or moisture-destroyer that "goes after" trapped moisture and "gets" it wherever it is in the system. That's real additional patriotic protection.

● Manufacturers are charging THAWZONE into new systems right at the factory, on both military and civilian equipment. While many other materials used in refrigeration equipment are difficult to get, yet THAWZONE is available, practically without restriction.

***It's a patriotic privilege to use THAWZONE, the MOVING dehydrant***

**HIGHSIDE CHEMICALS COMPANY**

**195 Verona Ave., Newark, N. J.**

THAWZONE

Fully Protected by U. S. Patents

The PIONEER FLUID DEHYDRANT

mixed. This year we bought the mixture (Du Clean No. 2) and cleaned the condensers with it as described in your article. The ready mixed acid combination is easy to use—just dilute it with equal parts of water. The condensers are cleaner and machines operate with less water for same head pressures.

*Harold S. Hanson,*
*New York, N. Y.*

S S S

## CLEANING DIRTY SYSTEMS

**QUESTION 495: We have been changing some of the 1936 Kelvinator Ice Cream Cabinets from Methyl Chloride to Freon. I have been cleaning the lowside and all parts with Carbon Tetrochloride, baking them afterwards. I have been having trouble with all of them from the highside float sticking, the Freon seems to loosen what appears to be tar.**

**Do you know of any type of screen, for example, felt, that would stop this tar-like substance?**

ANSWER: Freon-12 is one of the best solvents and cleaners for a refrigerating system that one can find It is even better than Carbon Tetrachloride. All this you have found out apparently to your detriment.

I am not sure that any filter found on the market will be capable of removing this gum or tar from the refrigerant. The gummy substance is dissolved by the Freon and circulates with it in such finely divided form that it is doubtful whether any filter will remove it. You might try, however, using a Zenith filter made by the Zenith Carburetor Company, 696 Hart Ave., Detroit, Mich., or the Aminco Purifilter, made by the American Injector Co., 1481—14th St., Detroit, Mich., or one of the new Trap-Dri units made by Automatic Products Co., Milwaukee, Wisconsin. These produce the greatest filtering value of any strainer or filter used in refrigeration.

If these fail, the only remedy would be to remove all the refrigerant and oil from the system, then distill it in order to reclaim the refrigerant. In removing the refrigerant and oil, it should be removed in liquid form if possible so that no distillation will take place in the system, thus leaving some of the gummy deposits in the system. In other words, the system should be pumped down to the receiver, then the liquid refrigerant taken from the receiver and put into some other container. The oil, of course, can be dumped out of the compressor through the filler plug or by removing the compressor base.

The compressor, condenser and receiver will be the three parts which will contain the greatest amount of this tar substance and in any other systems which you are converting to Freon, these are the parts in my estimation which should receive the most careful washing with Carbon Tetrachloride.

## WESTINGHOUSE SLOW STARTING

**QUESTION 496: I am repairing a Westinghouse Unit Style 815504, Model BsD12, Amps. 3-D, Serial 598812.**

**The unit runs nice and has an efficient running cycle but it labors terribly on starting except the first time after standing for three or four hours. Then it starts almost instantly. Other times it takes from 40 to 80 seconds to start. This unit has a resistance unit in the starting winding. Can this be removed and a condenser used? What size condenser should I use?**

ANSWER: I don't believe that a condenser can be used in place of the resistance coil in the Westinghouse refrigerator. I believe that such a change would necessitate a change in control and possibly in some wiring arrangements which would not make it worthwhile. Furthermore, I don't believe that this is where your trouble lies.

From the description you give, it sounds as though the unloader valve contained in the dome of the unit is not opening during the off cycle.

I am attaching hereto a tear sheet from the November, 1939 issue of THE REFRIGERATION SERVICE ENGINEER which contained illustrations of the Westinghouse unit. You will note by Fig. 1 that the unloader valve is operated in one direction by spring tension and in the other direction by magnetic action. You will also note by Fig. 2 that this unloader valve is in series with the starting and running windings of the motor.

It seems probable from your description that this valve is stuck closed and is failing to open, thus relieving the starting load on the compressor. The fact that the unit starts satisfactory after an idle period of three or four hours seems to bear out this thought.

## SUNBEAM UNIT

**QUESTION 497: I have an Electric Coil Refrigerator with a Sunbeam unit—it would be called a Cold Spot today. I have had the compressor all apart several times and**

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Wolverine has been in the best possible position to observe every development and change in the refrigeration industry. Almost since the first refrigerators were manufactured, a large proportion of the tube used in the industry has been produced in the Wolverine mill. The manufacturing operations of this company have always been "part and parcel" of refrigeration progress.

Today, Wolverine still produces tube for refrigeration purposes. However, the greater part of our facilities is now employed day and night on War Work. When peace comes, though, these facilities will not only be available again but Wolverine will be in an even better position than in the past to serve the refrigeration industry.

Within the past few weeks, the Wolverine Tube Company has become the Wolverine Tube Division of Calumet and Hecla Consolidated Copper Company. As the fabricating division of one of the country's oldest copper mining companies, Wolverine now offers tube controlled in quality from raw material to finished product. It is the type of tube that will be unsurpassed for the refrigeration needs of the present and future.

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set the point of contact as close as possible and have it turn free, and assembled and put new oil in it and put on test. While the oil is new and cool, the compressor will pull 28 inches of vacuum just like a flash. As it runs and warms up, it slowly loses its efficiency until it will run most of the time.

ANSWER: To begin with, I would suggest that you use only the best white oil, such as Argon, in these compressors. I don't know whether or not you change the oil during your overhaul of this compressor or what type of oil you are using, but Argon oil is the only thing used by Sunbeam. Because of the fact that the blades in this compressor depend so much on the oil to seal the surfaces, it is very important that the proper oil be used.

Another point worth checking on is to see that your blades are perfectly free. It may be that when the compressor warms up, the blades have a tendency to stick so that they are not forced out against the walls of the compressor, thus permitting leakage past the blades.

It sounds as though your trouble may be due to oil circulation in addition to a slightly low capacity pump. As I stated before, these units depend largely on the oil for blade seal and if the oil cooling coil is clogged, oil cannot get to the blades. This oil cooling coil is fed by the lower left hand fitting when looking at the pump from the bell housing. This coil should feel very warm if the oil is circulating through it. The fitting is exposed to the high side pressure in the bell housing which forces the oil into the coil. The other end of the coil feeds the lower half of the cylinder which is exposed to the low pressure side. In this way the pressure forces the oil in one end of the coil and suction pulls it out of the other end.

At the point where the coil enters the cylinder there is a small hole about the size of a small tag wire. In order to drill this hole at the factory, a larger one was drilled at the side of the cylinder block and then it was threaded and filled with a screw which must be in place or there will be no suction in the oil line. This is a possibility which should be fairly easy to check on and may very likely be your trouble.

## GRUNOW MODEL C

QUESTION 498: I have a Grunow refrigerator, Model C, and is about ten years old. It seems to screech and run a lot. What I would like to know is what procedure to take to charge the unit and where to get Carrene.

I was checking THE REFRIGERATION SERVICE ENGINEER of December, 1941, which stated that "The construction and operation of the Model C compressor was described and illustrated in the July, 1933, issue and Models K and M in the June, 1936, issue. Will you please give me all the help you can on these models.

ANSWER: The Model C Grunow refrigerator is one of the flooded type of systems employing either a high side float or a capillary tube as a metering device for the refrigerant. As is usually the case with a flooded system when the system becomes low on refrigerant, the oil has a tendency to travel from the compressor to the evaporator where it will be held until more refrigerant is added, thus forcing the oil back.

This condition is also accompanied by increased running time and by decreased refrigeration. It is very likely that this is the cause of your trouble at present. The increased running time will be due to the loss of refrigerant and the screech may be caused by insufficient oil in the compressor which is causing the seal to screech.

Carrene can be secured through any jobber around the country.

This refrigerant has such low operating pressure that it may be handled just like water in an open container. Therefore the method of charging the system is to attach a 3/16" length of tubing to a funnel, then open the purging cap in the top of the receiver, insert the copper tubing and funnel in this opening and pour the Carrene in until the receiver overflows. The machine is then started so that pressure will be created on top of the receiver, forcing the refrigerant into the evaporator. At the same time any air contained in the system is collected at the top of the receiver.

After a few minutes' running the purge valve can be cracked again, permitting air to be purged off. This should be done, if possible, while the evaporator is cold and the temperature of the suction line should be noted to determine whether or not sufficient refrigerant has been charged in.

When frost or sweating appears on the suction line, this is an indication that there is sufficient refrigerant in the system and some refrigerant should then be purged off until the frost returns within an inch or two of the evaporator.

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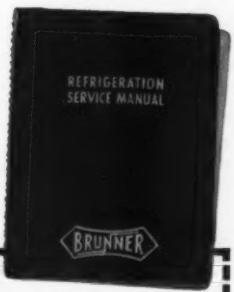
Remember, it's more patriotic to make a repair than sell a replacement because you save material for munitions.

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## FRIGIDAIRE EVAPORATOR PUNCTURED

**QUESTION 499: The question I have concerns a 1936 Super 7 Frigidaire household box or any of the Frigidaire Meter-Miser systems used about this time. The customer punctured the bottom of the evaporator on this particular box in trying to pry off a piece of chicken frozen to it. Of course all the Freon escaped and I imagined the only thing to do was to replace the entire sealed unit. The cost of a new unit is $65.00 and the customer does not care to put this much in repairs at this time.**

**I have read Herveen ads in the magazine for some time but always imagined that I am not equipped for work on hermetic units. I would like to replace the charge in this system if possible and would like any information you can give me on the best method on how to do it.**

**I would have to repair the leak in the evaporator first. I believe this is a stainless steel freezer, isn't it? I think I could weld the small puncture if I can get some stainless rod. My problem would be how to purge the system and replace the proper charge of gas. I imagine I can get Herveen from my jobber.**

ANSWER: I believe it is quite possible for you to make repairs on this Frigidaire Meter-Miser without any additional equipment over that which you most likely have now.

In the first place, the evaporators on these units are all sheet brass and are plated to give them a better appearance and to protect them against corrosion. Since brass can be readily soldered, I would suggest that you plug the hole with a brass screw, then solder it in place. No doubt there is considerable moisture in the system inasmuch as these systems operate on a very low vacuum and it is probable that moisture was drawn in when this vacuum was broken.

It will, therefore, be necessary to provide some means of dehydrating the system. This will be your most difficult part of the job. If you have no means of baking out the system you will have to rely on driers. This method will take more time and it is likely you will have trouble with moisture freezing in the restrictor until such a time as you have been able to get all the moisture out.

The system can be recharged with Herveen and the Herveen, of course, can be secured through your local jobber. It will be necessary to connect into the suction and liquid lines at the charging ports which are

usually located under the top lid of the cabinet. I would suggest that you use a separate pump to pull a vacuum on the system, then start charging the gas. Vacuum should be at least 28 inches and depending on how thoroughly you evacuate the air from the system will be the success of your later operations.

The amount of Herveen to be charged into the system can be determined from the name plate on top of the condenser which will indicate the proper charge of F-114 contained in the meter miser. When using Herveen you will charge the unit with 5 ounces less than the plate indicates.

The head pressure of the unit with Herveen in a 70° room will be 23 pounds. You may find it necessary to purge a slight amount out of the system or add some to it in order to obtain the proper refrigerant balance. A cold suction line would indicate too much refrigerant in the system.

## WHAT TO DO WITH BLOCK TIN

**Question 500: Could you give me some information on how to mend block tin tubing? So far I have had good success with a soldering iron, using pure tin instead of solder, but I would like to get more information on this. Could you tell me where I might get it? With the shortage of tin coming up, I think we may have to mend some of these tin beer coils instead of replacing them.**

Answer: I don't know of any other way that you can repair block tin tubing that is better than what you are doing at the present time. In other words, to solder it with pure tin, it would not do to use solder on these coils because electrolysis would attack the solder much more readily than it will pure tin. Of course a solder job can be done with solder but it would probably not stand up as long as the pure tin itself.

So far I don't know of anything that can be done with these coils apart from cutting out the bad section and then sweding one end of the coil and splicing the two loose ends together. This again requires soldering in order to make a leakproof joint.

One of the plastic tubings on the market is being recommended as a good substitute for block tin tubing for use in beer lines, soda water lines and sweet water lines. One of these tubings known as "Tenite" is distributed by Julius Blum & Co., 532 W. 22nd St., New York City. According to our information, this tubing is very successful as a replacement for block tin. However, I

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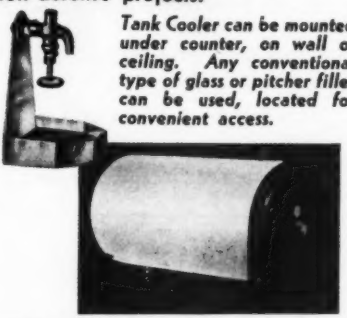

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have not been able to find out whether the heat conductivity of "Tenite" tubing is high enough to use it in the coils. From its appearance it would seem that it might be a better insulator of heat than a conductor, and if this is true, it would not be very satisfactory for a coil. Since it is satisfactory for the lines it would seem possible to utilize some of the lines now in these systems to repair the coils and replace the lines with "Tenite."

### GRUNOW TYPE K

QUESTION 501: I have a Grunow refrigerator, Model 67D, using a type K unit with which I am having difficulty. I would like some information regarding same.

I have worked on quite a few Grunow boxes, but have not had one that presented this sort of problem. I have taken the unit apart and washed it thoroughly with Carbon Tetrachloride and checked all vans to see that they worked freely. I also checked for leaks. It has been recharged with 300 viscosity (36 oz. required) and installed a sight glass and compound gauge above metering tube so I could watch the working conditions of the evaporator.

I also installed a new metering tube, dehydrator and receiver (Calumet type) which is all combined. I have recharged with Carrene and purged air from the unit. The unit, however, will only pull down to about 20° in the evaporator over a period of about two and one-half hours without the door being opened. Frost will form over the entire evaporator, but not on the suction line next to the unit, indicating that it is not overcharged with Carrene. At 20° the low side shows about 22" or 23" vacuum.

In checking Carrene going through the sight glass on back into the evaporator, I find it goes freely and continuously and showing no moisture in the system.

I installed a second new metering tube but found it works same as the first one. Then I disconnected the suction line from the compressor and installed a gauge to see to what vacuum it would pull and found the result to be 29". Then I shut the unit down to test the check valve and found the compound gauge stayed on 29" to show it did not leak back. The condenser is free of dirt. The temperature of the compressor dome is about normal compared to the other Grunow units on which I have worked.

Each time I made changes, I purged the air to be sure no air was in the system, and each time the entire evaporator would frost,

but not get cold enough to cut it off. If I put a tray of water or like substance into the box, the temperature would immediately go above freezing.

When this unit is cut off for several days it stands a deep vacuum, showing there aren't any leaks.

ANSWER: The first thing that comes to my attention regarding the Grunow refrigerator in which you are not able to obtain a low enough temperature is that your suction pressure is only 22" or 23" of vacuum whereas this pressure should be in the neighborhood of 27" if the proper temperatures are to be obtained.

This leads me to believe that the pump is inefficient and even though you are able to obtain 29" of vacuum with the suction line shut off, this is really no indication of the efficiency of the pump. It is quite possible in this type of pump that it will pull a very low vacuum with no load on it, but it will not handle a sufficient volume of gas at this low vacuum in order to provide adequate refrigeration.

It is possible that while the blades are perfectly free in the compressor, they do not fit up tight enough in order to stop leakage past the blades. I think you will find it necessary to dismantle this compressor again and hone the sides of the blades and fit the side plates of the compressor closer so that there is less clearance between contact of the blade and cylinder wall.

* * *

# *R.S.E.S. Chapter Notes*

## SECRETARY McDERMOTT LEAVES FOR SERVICE

*To the Members of the R.S.E.S.:*

THE columns of our official organ provides the opportunity of contacting my many friends in the R.S.E.S.

Uncle Sam is of the opinion that I can best serve the war effort in the military forces, and I am leaving for active duty about August 15. I am happy to contribute my bit, and in common with all, I hope that the job can be done in the shortest possible time.

One of my pleasant experiences has been as Secretary of your International Society


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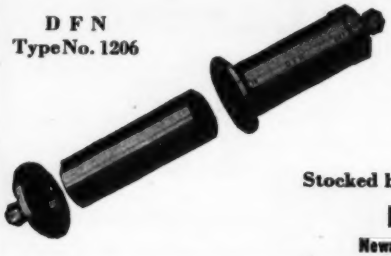

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during the past nine years. It is difficult to adequately express my personal appreciation for the fine cooperation and understanding of so many of the members. It has been this unselfish cooperation of the officers and members that has contributed so much to the growth and success of your organization.

May I ask you the continuance of this fine cooperation for your international officers in the future.

Here's hoping for an early and complete victory.

*Cordially yours,*
*H. T. McDERMOTT.*

## SERVICING REFRIGERATION EQUIPMENT IN AFRICA

MANY members of the Refrigeration Service Engineers Society and others will be interested in a letter recently received by International Secretary H. T. McDermott from Ernest E. Condon, Flushing, L. I., N. Y., from "somewhere in Africa."

Mr. Condon is an active member of the Society and has held official positions in both the local chapter in New York City as well as the New York State Association. He is one of several refrigeration engineers selected for important refrigeration work for military purposes.

In his desire to provide interesting information, Mr. Condon included in his letter much that was deleted by the Censor. His letter follows:

(Deleted)
May 29, 1942.

Dear Mac:

After some delays and a (deleted), I find myself safe and sound at my destination, minus my typewriter, so kindly accept this letter and future ones in pen and ink, until (deleted). There is too much to include even in a very long letter.

The country here is very interesting, climatic conditions fine, my health excellent, food and living quarters swell. So what more could I ask for?

There are so many things I would like to write you about, and I know very well I shall not finish this letter tonight. There are things I wish to include for the benefit of the R.S.E.S. members, and I hope when they read whatever you print from this letter that a lot of them who are worrying about priorities, etc., will realize that things at home, compared to here in Africa, are swell.

I was very sorry not to have been able to meet (deleted) sailing, I contacted the Commodore Hotel at New York and asked for you several times, but was informed as yet you had not registered in. Well I do know when I get back, you and I (deleted) visit, even if I have to attend a convention to see you.

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Our deliveries may be delayed because of the material situation, but be assured we are doing everything possible to serve you with a minimum delay.

I trust you are enjoying the very best of health and I do know you must be very busy. I am. I hope business in general is very good and everybody busy as bees.

Of the refrigeration boys aboard ship (deleted) Paul and I have been quite busy lining things up, getting onto the ropes, so that when the other boys get here, their path will be pretty clean, and they will know where things are, what to do, what not to do, etc.

Fritz Harder was held up in New York on his passport, so did not leave on the boat with us, but I presume by now he is on his way over here. We all are doing a swell job over here, that includes all branches of the (deleted) field, making the best of everything, whether good or bad. We came over here to do a good job, and *we will*. That is the general forethought of all. As long as we all continue to think that way, we will finish the job for the good old U.S.A. even if we are in Africa.

It was a thought on my part to try and establish an African Chapter of the R.S.E.S. I believe we could get enough fellows together to do so, and when our contracts are up others will have to fill our places, so my thoughts are that the chapter could still go on (deleted) I am anxious to know how you feel about it.

It was my intentions to mail postcard views of the country I am in to most of the boys back home, but censorship prohibits my so doing, so therefore I am afraid it will be sometime before I get letters to all. I would appreciate a small insertion in the monthly organ to that effect.

I would appreciate receiving late catalogs from manufacturers on the latest in refrigeration and air conditioning equipment.

Now for a little detail as to what we are up against here in Africa, then the boys back home will not think their jobs are so tough.

First of all we depend on (deleted). Receipt of our materials cannot be guaranteed, when in need of certain parts we cannot go to the next corner and get them like at home, so therefore we will do a lot of things here we would not think of doing at home.

The first job I was put on was a 40 ton (Italian make) ammonia job. My job is to put it together right and produce refrigeration and plenty of ice.

I applied my knowledge of the principles of refrigeration to the job and now am glad to say that by the time you receive this letter, I will have produced many tons of ice, plus maintaining refrigeration in a series of refrigerators totaling ten boxes 10′x12′x10′.

The occasion came up where I had to swedge different size tubing to get a couple jobs going. Not having a supply jobber handy, I went 18 miles where I could get to a lathe, made my swedging tools and got my job finished in time.

We have no dryers as yet, so I will make them also, as well as making a lot of my coils.

I am expecting to set a shop up next week, I guarantee it will be a honey when done. the work we will do will be amazing (I hope), and these jobs will be (deleted) O.K.

(Deleted) ahead of me, but not one do I believe

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we will not master. At a later date I shall write again in detail of the job we are doing.

On account of our altitude (7000 ft. above sea level) we are having a lot of fun with switch settings. If I break that thermometer of mine, I'm sunk.

Our temperatures (climatic) vary from 58° to 112°. I'm weathering the storm fine. Feel, sleep and eat good.

Well, Mac, let me hear from you and say hello to the boys of the R.S.E.S. for me. I miss them all.

With every good wish to all my friends,

As ever,

ERNEST E. CONDON,
A.P.O. 815 New York City.

✕ ✕ ✕

## MILE HIGH CHAPTER

*July 13*—After a thorough discussion as to whether or not the annual picnic should be held, a large majority voted in favor of the affair.

Messrs. Alexander, Hooke and Bowman were appointed by President John Berger as members of the Arrangement Committee.

The annual election of officers was held with the following results:

*President*—H. R. McCombs.

*Vice President*—Charles Land.

*Secretary-Treasurer*—R. C. Kimmel.

*Sergeant-at-Arms*—J. M. Richey.

After the new officers had been duly installed the meeting discussed the several orders pertaining to refrigeration.

## ST. LOUIS CHAPTER

*June 11*—The St. Louis Chapter took a busmen's holiday and made an inspection of Bettendorf's Hampton Village market.

Refrigeration plays an important part in this super market which is one of the largest in the country. Seventeen compressors and an air conditioning unit of ninety-five tons were thoroughly inspected by the Chapter members with L. V. Fleiter of the R. H. Tait & Sons Corporation as the guide.

The next visit on the program was the air conditioned library of Messrs. Eilers and Schaumberg which is the largest technical library in the country and a happy hunting ground for information for many engineers.

Those members who had not made the inspection of the air conditioning equipment on the visit of the Chapter last year were given the opportunity to learn the complete information. Mr. E. Gygax outlined the mechanical details.

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435 N. Waller Ave., Chicago, Ill.

Mr. Eilers then explained how the library is maintained as he conducted the Chapter through its many rooms.

An invitation was extended by Mr. Eilers for the Chapter to pick the hottest evening and assemble at the library for a meeting and for refreshments following.

### SAN DIEGO CHAPTER

*June 11*—The Chapter has been meeting on call, and the June 11 meeting was held at Pitts Refrigeration.

W. E. Gille was welcomed into the membership of the Chapter.

One of the famous San Diego deep sea fishing trips was suggested for the Chapter and a committee was named to attend to this function.

### ILLINOIS VALLEY CHAPTER

*June 12*—President Dean Reynolds disposed of the usual business, and among other business, the following prospective members presented their applications:

Earl Dorman, Harry Hauser, Clyde Tobias, H. A. Vielhak.

The meeting was principally devoted to a discussion of the problems confronting the service man during the present situation.

### TWIN CITY CHAPTER

*May 5*—President A. M. Palen disposed of the Chapter business and welcomed Ivan D. Harris to Chapter membership.

T. H. Ingersoll reported the progress that the Attendance Committee had made, and because of its work, has agreed to carry on for an additional three months.

The picnic plans have been successfully concluded and the Chapter will have its picnic on Aug. 16.

### WORCESTER CHAPTER

*June 23*—The usual business of the association was taken up, including financial reports and the work of the membership on the Auxiliary Fire Department.

As this was the annual election, the following officers were elected and installed in office:

*President*—Michael Colbert.
*1st Vice President*—James Hammill.
*2nd Vice President*—Harry Manchester.
*Secretary-Treasurer*—John Brosnan.
*Sergeant-at-Arms*—Robert Davis.
*Board of Directors*—C. S. Van Wert, John Osper, Al Moors.

The Chapter discussed the details of the annual banquet.


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● Our long experience and complete facilities enable us to furnish the exact gaskets for every refrigeration need. Our service to manufacturers, to jobbers and to service men helps speed war production as well as ordinary requirements.

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### KANSAS CITY AUXILIARY

*June 9*—Mr. & Mrs. E. L. Tramposh acted as host and hostess for the auxiliary meeting.

Mrs. J. DeWilde disposed of the usual Chapter business, and a remembrance was sent to Mrs. Andrews.

### MISSOURI VALLEY AUXILIARY

*May 21*—The meeting was held at the home of Mrs. Flohr. The usual reports were read and approved, and Mrs. Buckman gave a report on the national convention which she attended as the Chapter delegate.

The charter which the national association presented to the Chapter at Chicago was displayed.

A social hour followed, at which time refreshments were served.

### ROCKFORD AUXILIARY

*July 6*—The meeting was called to order by President Mrs. Arthur Overman.

Mrs. Walter Larson was named as Secretary of the Auxiliary.

A defense saving book has been started for the Chapter, and the funds from the June 15 card party were the initial investment in defense stamps.

## J. M. FERNALD, DECEASED

THE death of J. M. Fernald, formerly general manager of the Baker Ice Machine Co., Inc., Omaha, Nebr., and head of the Commercial Refrigeration and Air Conditioning Branch of the War Production Board, occurred in Washington, D. C., Monday, July 27.

A quiet and unassuming engineer, in recent years Mr. Fernald had come to be recognized as one of the leading executives in the refrigerating machinery and air conditioning industries. He was one of those rare executives combining sound technical training with practical sales vision and leadership. With his wide experience and technical knowledge, Mr. Fernald was well qualified to assume a government post in Washington, and he had fulfilled the duties of that trying position during recent months in a manner to meet the approval of the industry.

Following eighteen months' service in the Engineers Corps of the United States Army in the A.E.F., he was first sales engineer and later New York district manager for the Cutler-Hammer organization. During that time he gained special recognition for industrial research. The American Institute of Electrical Engineers credited him with original work in the application of automatic

control in the textile industry and in the application of electro-magnetic clutches in the paper making industry.

With mechanical refrigeration beginning its commercial development and spectacular growth in 1926, Mr. Fernald turned his attention to that field, becoming associated with the Electric Refrigeration Corp., later Kelvinator, as assistant director of commercial sales. Within two years he was appointed head of the commercial refrigeration division of Kelvinator Corp., and left that position to become general manager of the Baker Ice Machine Co.

With his vast store of quiet energy and ability to get things done it was inevitable that Mr. Fernald should come to play a prominent part in the civic and business affairs of his community, as well as of the refrigerating industry. In June 1936 he was elected president of the Omaha Manufacturers Association, and later that year, in November, was elected president of the Refrigerating Machinery Manufacturers Association.

Funeral services were held at Waltham, Mass., July 29.

## PENN'S BOSTON OFFICE MOVES

EFFECTIVE July 1, 1942, the Boston branch of Penn Electric Switch Co., Goshen, Indiana, will be located at 50 Hunt St., Watertown, Mass. Mr. A. W. Barr, branch manager, announces that the new telephone number is Watertown 5290.

## REPRESENTS CHICAGO-WILCOX ON COAST

MERLE G. HAYNES was recently appointed as the west coast representative of the Chicago-Wilcox Mfg. Co., Chicago, for the company's line of refrigeration gaskets. Mr. Haynes is located at 1334 Potrero Ave., San Francisco, Cal.

## *Classified Ads*

**Rate: Two Dollars for fifty words or less. 30 cents for each additional ten words or less.**

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It is possible that in some instances, delivery may be delayed. Should this occur—remember—winning the war MUST come first! Every American will gladly accept temporary inconvenience or sacrifice and count it a small price to pay for final Victory.

*During these difficult times, you may rest assured that Davison will continue to make every effort to assist the industry in accomplishing its part in the solution of present-day problems.*

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*Silica Gel Department*

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BONNEY TOOLS

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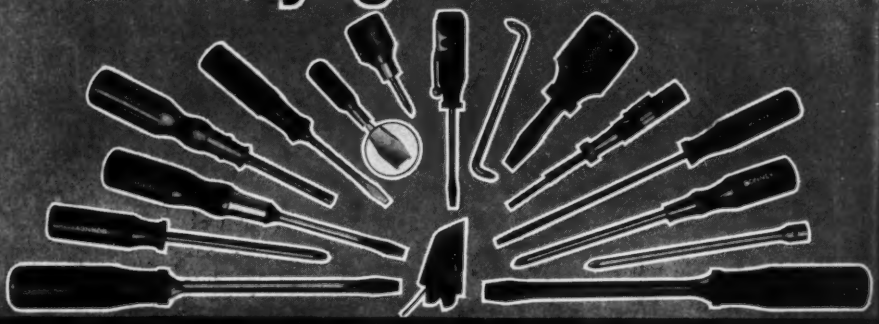

UNDER normal conditions it isn't necessary to "baby" any Bonney Tool. In a war time economy with good tools scarce and hard to replace it's necessary to "baby" *all* tools in order to make them last for the duration.

Be sensible with *your* tools. *Don't* use a screw driver for anything but turning screws. It wasn't designed to be used as a pry bar for removing compressor cylinder heads or shoving motors back on their bases. It wasn't designed to be used as a chisel. Use a pry bar for the jobs requiring one . . . a chisel when a chisel is needed.

Screw drivers are designed with different size tips to fit different, standard size screw slots . . . and they are only for use in those screw slots for which they were designed. *Be sensible!* Don't try to use them in oversize or undersize slots. Sure! You'll break a tip occasionally in normal use. But with care, it can be re-ground and the screw driver is as good as new.

Because different sizes and different types of screws require different size screw drivers, we include 16 different types of Bonney Screw Drivers made in 33 different sizes in the Bonney Line. Every one is designed for a particular size screw and for a particular application.

Our business is to sell all the tools we can make . . . but we want you to take the best possible care of *your* Bonney Tools so that you won't be disappointed in your inability to get all of them you want during the war period.

So again we say . . . *be smart . . . be sensible* . . . take good care of your Bonney Screw Drivers. It's money in *your* pocket.

The facilities of the Bonney organization are today being devoted almost entirely to supplying Bonney Tools for the war effort . . . the same tools you have found to give such excellent service during peace times.

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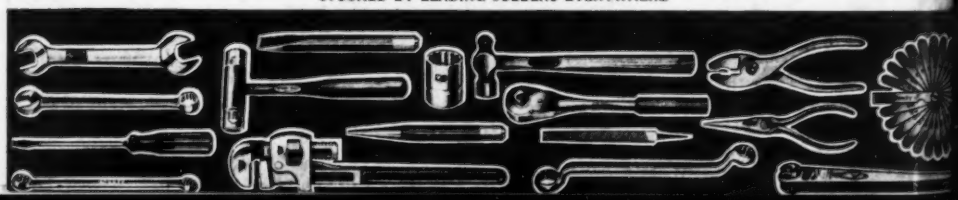
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